

# THE IRON AGE

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## Workers and "Talent" Share in Profits

A BONUS plan, in which stockholders, talent and workers share in profits over and above a fixed return for capital, has been employed for years by the Bergen Point Iron Works, Bayonne, N. J. President Smith tells about it in the accompanying article.

If earned, any surplus over 10 per cent to stockholders, plus certain increments to stockholders and talent, is divided as follows: Two-ninths to stockholders, four-ninths to talent and three-ninths to employees.

Essential principle of plan is based on the "equity and social advantage of paying a fair price to labor and talent."

THE subject of fair wages is part of a still broader subject—fair prices. Both have been analyzed and discussed ad nauseam. Karl Marx is for me the great apostle of the doctrine that all surplus value produced by labor and not retained by labor has been wrongfully withheld by the capitalistic employing class; that all the accumulated capital and wealth artificially created that is in the world today and which has been saved from many years of toil has been virtually stolen from the exploited workers who produced the wealth.

There are many others who now teach that doctrine, and there were some before Karl Marx, and with Karl Marx lived a school or coterie more or less in touch with him who stimulated his thoughts and thus helped him to produce his monumental work, "Das Kapital," which has had such a mighty and blighting effect on civilization.

I say "blighting" with some doubt, for I believe there is much good to be derived from Karl Marx's work if his indictment be fairly studied and means sought to cure the evils he has uncovered, but at the same time I believe the immediate effect of his writings has been to instigate envy, cupidity, self-pity and revenge in the lowest orders of society, wherever his influence has penetrated. I lay the

Russian situation at his door, and also the industrial unrest and discontent that in various places today plagues the would-be busy world.

Perhaps the doctrine of unpaid-for-surplus-value, the doctrine of Karl Marx, is a natural "counter force" which has been unwittingly and inevitably built up by the industrial process to check its ascendant swing. But I do not believe it cannot be met, its value to humanity extracted, and its poison drawn. The Bergen Point Iron Works contingent-wages plan is our modest effort in that direction, to keep the industrial process still swinging upward.

While Karl Marx inspired the Bergen Point Iron Works plan by exposing so bitterly the faults of the industrial system, Francois Fourier, the eighteenth century French Socialist, inspired the remedy we

## Bergen Point Iron Works Explains Its Bonus Plan to Employees

THE directors have found that there is some misunderstanding of the principle adopted by the Bergen Point Iron Works for a fair "division of the spoils" among the officers, stockholders and employees, and that when a so-called "bonus" is paid it is something considered either a gratuity savoring of charity or else accumulated wages to which the employees were previously justly entitled, and hence wages wrongfully withheld by the management which would have been more appropriately distributed on the usual pay days during the year.

The so-called "bonus" is not a gratuity. It is accumulated wages to which the employees are justly entitled, but this portion of their wages cannot be disbursed piecemeal on the usual pay days simply because the amount cannot be determined until the accounts of the company are carefully analyzed and its financial progress for a given period arrived at.

Business of any kind, and especially the business of the Bergen Point Iron Works, is like fishing in the sense that the catch is very uncertain. Sometimes we have better luck than at other times, even with the same judgment and industry. The aim of the Bergen Point Iron Works' system of dividing the spoils is to ascertain everybody's proper share, as nearly as we can, when we have a "good catch," so to speak.

On account of the precarious and varying nature of the Bergen Point Iron Works' business, which would make frequent analyses of the books misleading by not expressing average results, as well as on account of the labor involved, we have

adopted the plan of "balancing our books" twice a year, on July 1 and on Jan. 1.

We aim to pay on the regular pay days the market value for services rendered by employees of every class as nearly as that can be determined by comparison with the wages paid by others in similar lines of work. By the semi-annual accounting the directors determine how much money or wealth in any kind of value the company has accumulated or lost in the preceding six months.

If the gains are sufficient, a dividend up to 5 per cent on the total capital invested at the beginning of the six months' period (that is, at the rate of 10 per cent per annum), is disbursed to the stockholders on the ground that this dividend is the market rate for capital invested in such a business as the Bergen Point Iron Works, just as much as the wages disbursed throughout the six months' period were the market rate for wage-paid services.

If the gains are not sufficient to declare the above dividend to stockholders, but are sufficient to justify a dividend at the rate of 6 per cent per annum or more, as large a dividend as can safely be disbursed is paid to the stockholders, which is considered payment in full for the use of their money.

If the gains are insufficient to declare a dividend at the rate of 6 per cent per annum, the deficiency below the 6 per cent rate is allowed to accumulate with interest thereon at 6 per cent per annum as a preferred lien against future earnings in favor of the stockholders.

If the gains exceed the amount necessary to

are trying out to avoid the crash that Marx says is ahead.

What is a fair price? Without quoting authorities, I offer this definition: A fair price is one which gives to the seller a profit and to the buyer a benefit. In other words, in any exchange at a fair price both parties benefit, both receive more than they give. In this paradox lies the secret of creating wealth; and it applies to wages quite as truly as it applies to goods offered on the market.

It has always seemed to me that Karl Marx overlooked entirely the advantage a workman found in selling his labor or skill for money with which he could buy the labor or skill of other men; and confined his great ability to enviously and bitterly pounding home the undisputed fact that the buyer of labor or skill usually pays less than the labor or skill is worth to him. I have always been surprised that more champions have not sprung forward to make this obvious defense of the capitalistic system.

In the two preceding paragraphs I essayed a definition and an explanation of a fair price. I would now like to be able to prove that the fairest price is one which gives to the seller exactly the

same profit measured in money that it benefits the buyer by the same measure. At the present writing I cannot prove this, though I believe it to be substantially true by circumstantial evidence. Adam Smith pointed out that man was a "trading animal"; that wealth resulted from trade; that trade resulted from the mutual advantage that buyer and seller found in the price agreed upon.

I would like to add to Adam Smith's foundation, that if wealth results from trading, more wealth results from more trading. In short, I would say that the rate of speed in the creation of wealth is directly dependent on the "velocity of trade." Now if the "velocity of trade" depends on the mutual advantages gained by buyer and by seller, the greatest velocity of trade, and hence the most rapid production of wealth must result when the advantage of selling to the seller is exactly equal to the advantage of buying to the buyer, when both parties are equally anxious to trade.

This logic has an analogy in geometry, it has the semblance of a mathematical proof. In general, I believe it is true though I do not claim mathematical accuracy in a field which involves men's opinions.

*From a pamphlet  
distributed to workers)*

provide a dividend of 5 per cent for the first six months, or at the rate of 10 per cent per annum, the excess above 10 per cent is divided into three parts: one part for the stockholders, for capital, for the body of the company, so to speak; one part for the judgment, foresight, driving force, for the wits of the company; and one part for the employees, that is, to continue the simile, for the hands of the company.

These parts are not necessarily equal and the relative proportion has to be determined by the directors. The underlying principle is to apply the earnings according to the merits of the case—in other words, to make the punishment fit the crime.

The directors are supposed to know why the company made the good showing and must be relied on to endeavor to divide the earnings as fairly as they can when there are any extra gains to be divided.

It must be evident from the above explanation that any extra compensation thus found to be due to the wits or to the hands of the company is not a gratuity. Nor is it profit in the sense that the share of the stockholders is profit and therefore subject to the payment of income taxes by the Bergen Point Iron Works. It is simply a portion of the wages contingent on the outcome of the six months' period which cannot be determined until the expiration of the period. So far as manufacturing costs go, these contingent earnings of the hands and wits are to be included in the same category as the basic or market wages paid on the regular pay days.

The argument nevertheless is suggestive and it applies to wages as well as to goods.

**Surplus Divided With Workers**

This theory is the basis of the Bergen Point Iron Works contingent-wages plan. We figure that wages, uninfluenced by a restraint of trade such as is exercised by trade unions, will tend to fall to the cost of producing the service. That, in the face of threatened unemployment, a workman, unrestrained by a trade union or by the general moral influence of a trade union, will virtually sell his labor or skill for about what it costs him to produce it with little or no profit in the transaction for himself. In such a case the advantage of buying the labor or skill by the capitalist would be much greater to the purchaser than the advantage of selling would be to the workman. This is what Karl Marx denounces in the capitalistic system. Modern economists see in it also lack of purchasing power in the masses and consequent stagnation of trade.

The Bergen Point Iron Works believes that trades unions have done a most useful work in combatting that situation and procuring for the seller of labor

or skill a high enough price to include some profit over the cost of production of the service. We believe that in the United States the rates of wages are now considerably above the "cost-of-living." But we do not rely on trades unions for a complete cure, and, in fact, we believe that reliance on trades unions alone will develop other troubles outside the subject of this article.

The Bergen Point Iron Works, while holding the aforesaid opinion that wages in general are well above the necessary cost of living, nevertheless feels that the error will be on the safe side if it be assumed that the market rate of wages is in reality fixed by the accepted cost of living, and if it be assumed that the market rate for the use of capital is 6 per cent per annum. After setting aside funds to pay the market rates for labor and 6 per cent for the use of capital, we consider any surplus as properly to be divided in some way between labor and capital.

Karl Marx seems to have divided the human forces working to produce wealth out of the gifts of nature, into capital and labor. He classed talent or directive force apparently with labor. But Fourier clearly differentiated spirit or talent or directive force from either capital or labor, though as a matter of fact this spiritual agency is usually contributed to some extent by both of the parties furnishing the other two constructive elements.

The Bergen Point Iron Works has followed Fourier and recognizes three partners working together in our shop and office and drafting room to produce wealth which we can sell to the public. Our platform then is to divide any surplus we find every six months, after paying the going market rates for labor, for talent and for capital, into three parts for distribution among these three partners.

We do not claim that a general formula for this distribution can be laid down, and even in one specific industry like our own the equitable apportionment would change from time to time depending on the nature of our undertakings.

Fourier suggested that any surplus be divided as follows:

*Four-twelfths to capital.*

*Five-twelfths to labor.*

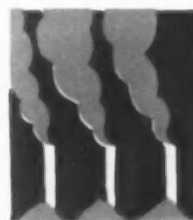
*Three-twelfths to talent.*

The Bergen Point Iron Works, starting business in 1906, continued to 1917 in rather hazardous risks for capital and very dependent on talent, so that when we declared our first dividend in 1913 and for four years thereafter we considered capital entitled to an additional 4 per cent per annum before bringing in the other two partners. After capital had received 10 per cent per annum any remaining surplus was divided into three equal parts and disbursed one-third to capital, one-third to labor and one-third to talent.

Since 1918 we have modified the formula twice and for the last 14 semi-annual divisions we have used the following method:

"If earned, a dividend of \$3 per share to stockholders; if

(Concluded on page 827)







*Magnification of nickel veins extending into surface of plated spring.*

## Spring Wire Specially Heat Treated

By R. W. COOK

*Vice-President and Factory Manager,  
Wallace Barnes Co.,  
Bristol, Conn.*

**S**PRINGS are made of other alloys than steel—notably brass—but by far the largest numbers are made of steel. This is because many desirable properties are combined in steel—such as strength, elastic limit, toughness, hardness, stiffness and endurance—and furthermore these properties may be varied to suit the diverse requirements met in industry by appropriate selection of steel of correct composition, and doing the necessary amount of heat treatment and cold work on it.

As is well known, alloy steels are now preferred for the flat leaf springs used under automobiles. Alloy steels are also desirable for coiled springs operating at temperatures, as, for instance, chromium-vanadium steel springs for gas engine valves. Stainless steel springs have also been made for corrosive atmospheres, since a minor amount of surface damage by rust will do a major amount of harm. In passing, it might be mentioned that surface conditions have more influence on spring performance than on almost any other machine part.

In order that we may not get lost in this tremendous field, attention will be confined in this article to plain carbon steel wire or strip for making coiled springs. Manufacture of these steels is virtually the same in the melting and hot-rolling process as for any other first-class open-hearth metal. Manganese is rather higher than in corresponding carbons for other purposes, going up to about 1 per cent in the medium hard grades.

In the annealed condition the strength, elastic limit and hardness of these steels increases directly with the carbon content. These properties are enhanced in two general ways, namely, by cold work (wire drawing or cold rolling) and by heat treatment. Cold-worked wire or strip has a high ultimate strength, even higher than can be imparted to the same steel by heat treatment, but the quenched and tempered wire has a much higher yield point. Therefore, quenched and tempered wire would prob-

ably be favored for springs which have rigid limits of size, which cannot acquire permanent sets in operation, and which must rebound quickly (or the coil may be made of soft wire and then heat treated). If great toughness is required and little sag or sluggishness is permissible, then cold-drawn wire would be used.

Since heat treatment is impracticable on very small wire on account of surface damage, tiny springs are also made of cold-drawn wire. For springs which must absorb heavy shocks the lower carbon higher manganese analyses would be chosen.

Such statements as the above are to be interpreted in the most general terms.

We are able, through various combinations of cold work and heat treatment to produce spring materials which have tensile strengths as high as 400,000 lb. per sq. in. and which will work at stresses in the extreme fiber as high as 300,000 lb. per sq. in. without fatigue rupture. Clock spring wire (really a small strip) is annealed and cold rolled many times to the correct size and then hardened and tempered; music wire is patented and cold drawn to size; "tempered wire" is annealed, cold drawn to size and then quenched and oil tempered, and so on.

It is apparent that the preliminary heat treatment known as patenting and the intermediate treatments given to music wire, for instance (which is drawn from a rod approximately  $\frac{1}{4}$  in. in diameter down to wire as small as 0.004 in. in diameter, having a uniform tensile strength at some figure between 300,000 and 400,000 lb. per sq. in.) must approach absolute uniformity. It will also be apparent that annealing the coils of strip for clock spring wire must be uniform when it is considered that the material must be rolled many times to final size, then quenched and tempered to a tensile strength of 300,000 lb. per sq. in. It is interesting to figure that one thousand clock springs might require about two miles of stock, all of which is stressed up to and be-



yond its yield point (250,000 lb. per sq. in.) in its original winding and held at that stress inside a ring and that a single infinitesimal flaw will cause breakage. Yet this processing is carried on so uniformly that not over 1 per cent of the springs break in the winding.

The two manufacturing processes above mentioned are entirely different in nature, and yet each produces spring material of great usefulness and high physical properties. Patenting consists of passing the "green" rods (hot-rolled material from the rod mill) slowly through a high temperature furnace, then quenching from about 1800 deg. Fahr. in lead or air at a speed to produce sorbite. The wire is then cleaned and cold drawn through round dies, during which time the coarse grains obtained by the heat treatment are elongated into "fibers." This structure is associated with great toughness, particularly when the wire is tested in torsion. The processes of patenting and drawing through a series of dies are then alternated down to the finished size, the wire remaining in the sorbitic condition throughout.

**SPRING** materials having tensile strengths of 400,000 lb. per sq. in. are produced by combinations of cold work and heat treatment.

Spring steel containing up to 1 per cent of carbon may be folded on itself, either across or with the grain.

High-carbon steels susceptible to hydrogen embrittlement are never immersed in acid. Flat strips are cleaned mechanically by a sand-blasting device in the Wallace Barnes plant at Forestville, Conn.

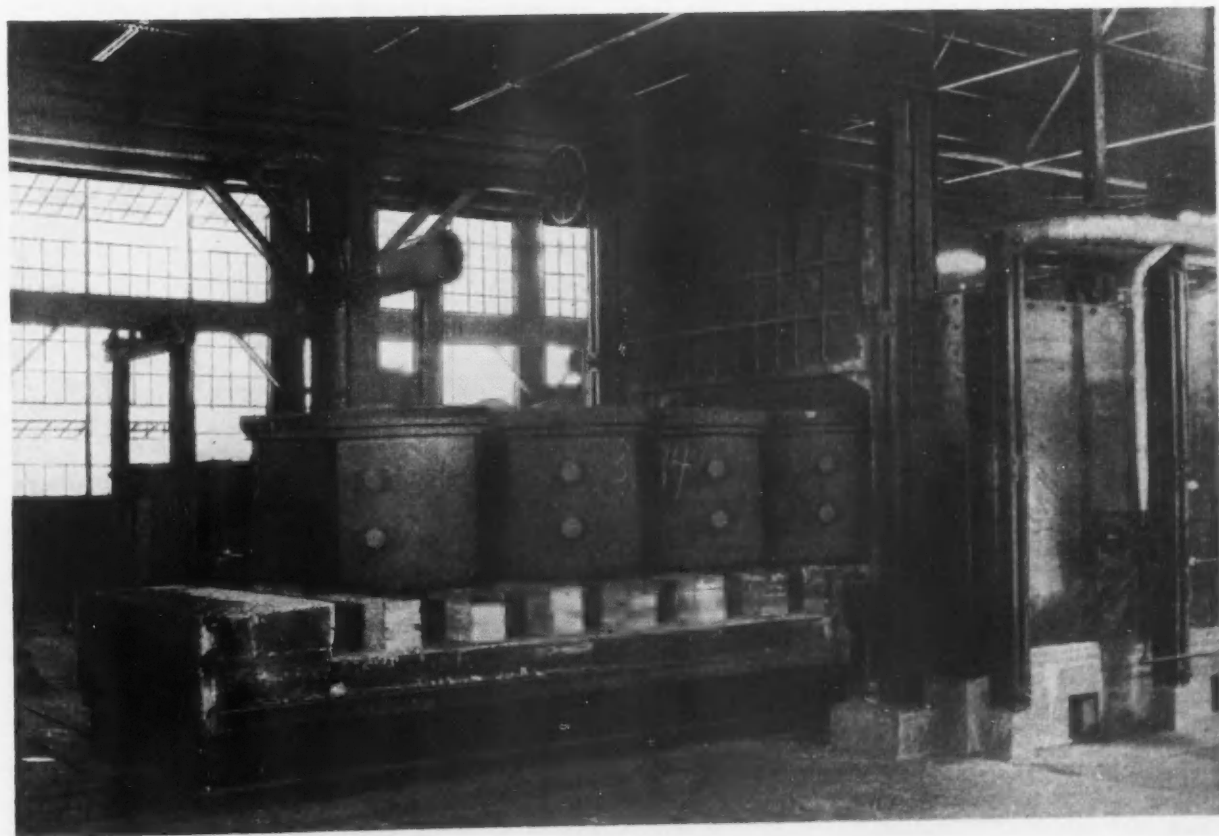
Quenched and tempered springs cannot be rust-proofed by a process which requires preliminary cleaning in acid.

Contrast with this the treatment of the clock spring wires. The rods are annealed at the critical range under such conditions as will bring about complete spheroidization of the carbide and a hardness of about 75 to 80 Rockwell B. The material is

then cleaned and rolled approximately 20 per cent. A "process anneal" is then given at a heat considerably under the critical range to relieve the cold-working strains, but leave the structure undisturbed. Alternate rolling and annealing down to finished size is then continued. Then it is hardened and tempered.

Still another important effect of heat treatment in spring steels is the ductility or forming qualities of cold-rolled sheet, used for making flat springs which have to be bent, formed, or deep drawn. We recently

looked for much trouble with parts which required sharp bends or deep drawing which had to be made of spring steel. Today we find it entirely possible, by thorough spheroidizing and by careful regulation of the size and distribution of the iron carbides, to produce steels up to 0.80 per cent carbon with excellent drawing qualities, and up to 1 per cent car-

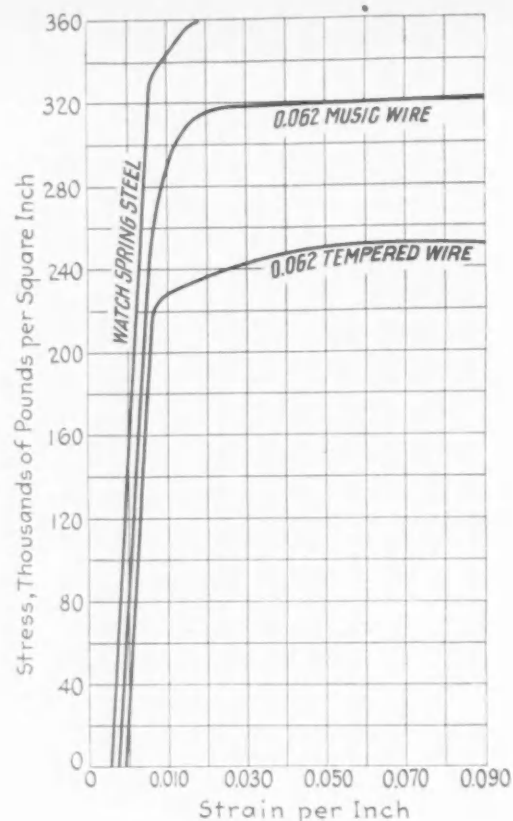


*Annealing pots and furnaces at Forestville*

bon which will fold on itself either with or across the grain.

Certain fundamental differences exist in the methods of heat treatment. Patenting is done continuously, that is, the rod is uncoiled and passed through the furnace as a single strand. Rods are patented in long low muffle furnaces; wires are patented by passing them through hot lead baths, to protect the surface from oxidation or decarburization. Thin strip is process-annealed in the same type of equipment, but of course at more moderate temperatures. Wire is quenched and tempered by unreeling the coil and passing the metal continuously through a series of lead heating and oil cooling baths. Gentle drawing heats are frequently given flat wire by placing one or more hot plates in series, and holding the passing steel down to the heat by suitable weights.

Preliminary annealing of rods for cold rolling (and the thicker gages of strip) is done in pots or by heaping the coils loosely on the bed of a car bottom furnace, covering the heap with a pressed steel bonnet, sealing the edges and heating the entire



*Stress Strain Diagrams of*  
 (a) Music Wire  
 (b) Watch Spring Wire  
 (c) Tempered Spring Wire

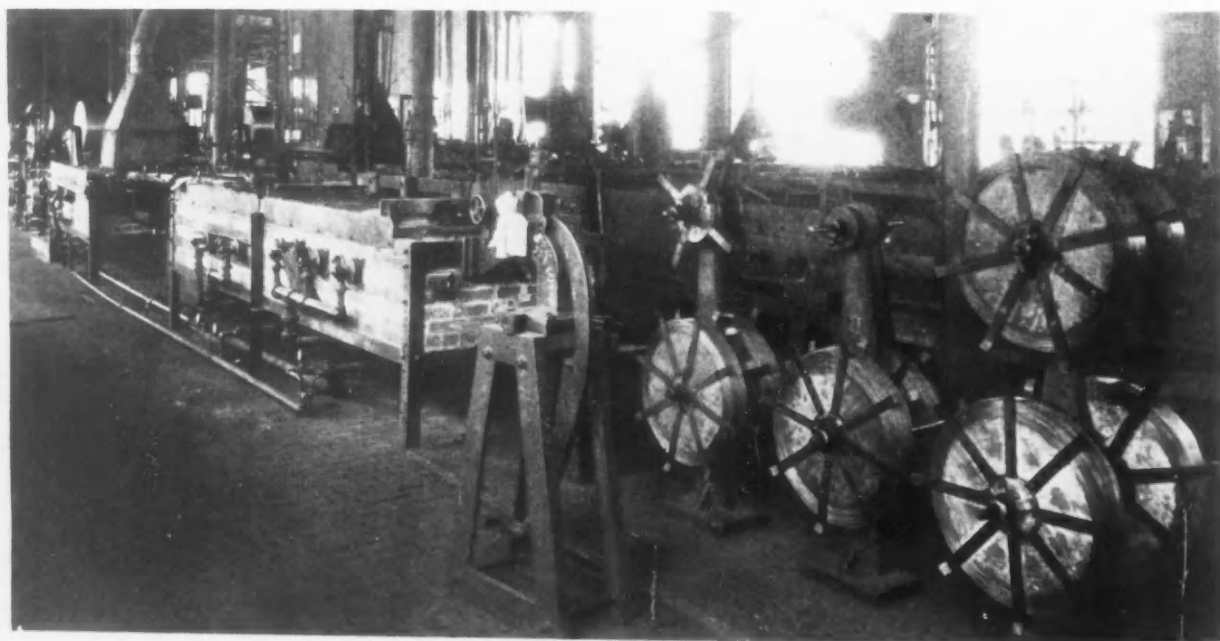
mass for a definite time-temperature schedule. Decarburization is prevented by circulating city gas through the pots. For the highest quality work city gas is unsuitable, for its composition and moisture content are liable to vary without notice. Any accident which interrupts free flow of the gas would also damage the contents. The alternative is to pack the coils in cast iron borings.

Springs which are heat treated after coiling are seldom made of wire smaller than 10 gage (0.135 in.). The heat treatment is done in batches—a scoopful is spread out on a sheet nickel pan and placed in a hearth furnace operating with an excess of gas. A few minutes brings them to heat and they are quenched in oil. Subsequent drawing is done in rotary muffle furnaces in a gas atmosphere.

One seemingly minor heat-treatment operation has disproportionate in-

fluence on the quality of high-carbon materials. I refer to baking the rod or strip after cleaning in acid. Green rod or strip has more or less mill scale attached to it; patenting in an open muffle also pro-

(Continued on page 817)



*Lead and oil baths for heat-treating watch spring wire*

# Artificial Atmospheres for Electric Furnaces and Their Application

**E**LECTRIC furnaces with hydrogen atmospheres have been used for some years by the General Electric Co. for copper brazing steel parts together in the manufacture of certain complicated assemblies, and for annealing sheet steel, strip and lamination punchings for electric generators and transformers. Results obtained and the operating technique developed indicate that a wider field of application is merited.

One principal obstacle to this, however, has been the difficulty of obtaining the required gases in adequate quantities and at low cost. A study of this phase has resulted in development of simple apparatus for producing, from readily available materials, suitable gases rich in hydrogen, and at a fraction of the cost of hydrogen produced by the usual methods.

To get a clear conception of the function of a furnace atmosphere it is necessary first to understand what causes metals to oxidize, or the oxides of metals to reduce. The reactions which take place, and the reasons therefore, are known to scientists and metallurgists, but they are not well understood by the average layman. The subject is presented in three parts:

1. Principles involved in oxidation of metals and reduction of metallic oxides, with their relation to furnace atmosphere.
2. Methods of producing gases required for furnace atmospheres.
3. Possibilities for use of furnaces with such atmospheres in the steel industry.

It is well known that, if a piece of iron is heated in the atmosphere, or in a furnace, a black coating of iron oxide will be formed. It is also well known that, if the piece is again heated in an atmosphere of hydrogen or carbon monoxide, the oxide will be converted back to iron.

These reactions, while common and apparently simple, depend for their effect upon definite physical and chemical conditions which involve temperature, vapor pressures of oxide, par-

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tial pressures and chemical equilibrium relations of the component gases in the atmosphere under consideration.

For example, the piece of iron will not oxidize in a furnace at low temperature. Again, if the piece be already oxidized, the oxide will not be reduced or converted back to iron in an atmosphere of hydrogen at low temperature. A certain temperature is necessary, with other conditions, to produce the reactions.

Iron oxide,  $\text{Fe}_2\text{O}_3$ , under proper temperature conditions combines with hydrogen,  $\text{H}_2$ , producing iron,  $\text{Fe}$ , and water vapor,  $\text{H}_2\text{O}$ , according to the reaction



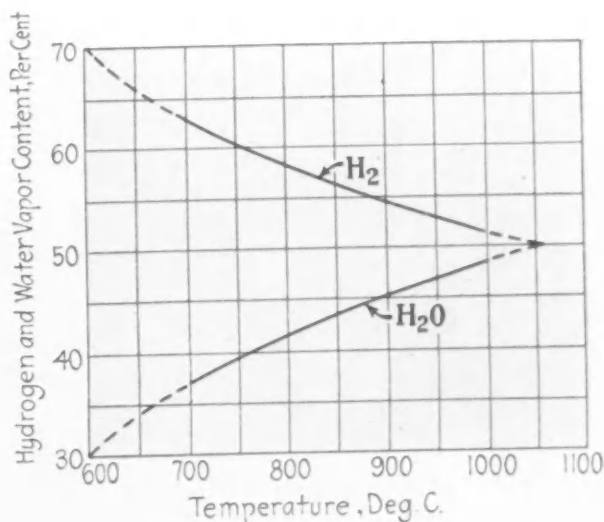
This reaction, which really takes place in two steps or stages, cannot go on indefinitely with a given supply of hydrogen, since the hydrogen used up is replaced by an equal volume of water vapor, and the atmosphere would soon contain too large a proportion of water vapor. The extent to which water vapor can be present and not prevent the reaction is known as the equilibrium condition in the iron oxide-hydrogen-water vapor system.

More correctly, chemical equilibrium is the point at which no reaction takes place in either direction, the atmosphere being neutral to the charge. This equilibrium point varies with the temperature, as shown by the curves (Fig. 1), and also with the pressure, as will be shown later.

Metallic oxides are dissociated by heat. That is,

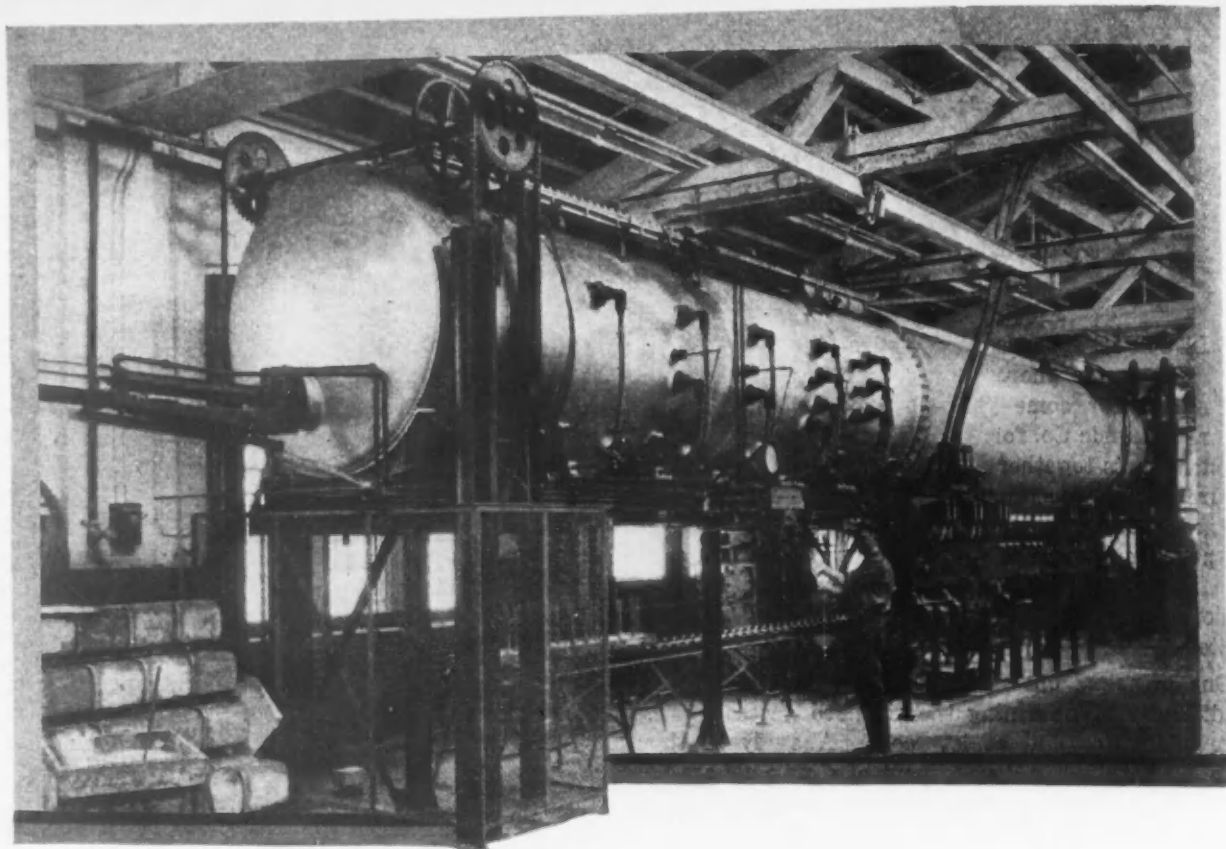
the oxygen is driven off in a manner somewhat analogous to the change of physical state represented by the vaporization of a liquid. Vaporization of liquids takes place under definite conditions of temperature and pressure, and if either of these factors is varied the rate of vaporization will vary. If the temperature is lowered too far with a given pressure, condensation of the vapor occurs.

Metallic oxides, at raised temperatures, exert partial pressures of oxygen which, like saturated vapors such as steam, have a definite



**FIG. 1—Equilibrium Relation of Hydrogen and Water Vapor at Various Temperatures in the Reduction of Iron Oxide by Hydrogen**





relation between temperature and pressure. This may be well illustrated by an experiment to show the dissociation of mercuric oxide into mercury and oxygen.

If mercuric oxide be heated in a closed chamber to which an exhaust pump is connected, the oxide will be dissociated into mercury and oxygen, the oxygen being removed by the pump as fast as it is driven off. If now the pump be stopped, the dissociation will cease when an oxygen pressure of 1.6 atmospheres has been built up, assuming a constant temperature of 1112 deg. Fahr.

At that pressure and temperature the system mercuric oxide-mercury-oxygen is at chemical equilibrium. If the oxygen pressure be now lowered below 1.6 atmospheres, by restarting the pump, the dissociation will be resumed. And if the oxygen pressure be raised above 1.6 atmospheres by some means, the reaction will be reversed, the oxygen combining with the metallic mercury to form mercuric oxide.

These reactions involve a relation among temperature, vapor pressure and chemical equilibrium; and they will take place only under fixed sets of conditions.

#### Dissociation Pressure at Equilibrium

At equilibrium the oxygen pressure is termed the dissociation pressure of the oxide at the stated temperature. In this experiment, with only one gas (oxygen) in the chamber, we can have an oxidizing condition, a neutral condition or a reducing condition at will, by varying the pressure only.

With atmospheres containing several gases such as hydrogen, oxygen and water vapor it is necessary to consider the effect of partial pressures. Partial pressure is defined as that part of the total pressure due to a particular gas in the mixture. Dalton's law of partial pressure states that the partial pressure of each individual gas in a mixture is independent of the

partial pressures of all the other gases, and that the sum of the partial pressures of the constituent gases equals the total pressure.

Returning now to Fig. 1 and the relation between hydrogen and water vapor in the reduction of iron oxide, it will be observed that, if we increase the hydrogen content of the hydrogen-water vapor mixture above equilibrium, the free hydrogen will combine with any free oxygen present or procurable. This has the effect of lowering the partial pressure of oxygen. It may be compared to the action of the pump in the mercuric oxide experiment.

As the partial pressure of oxygen is thus lowered, more oxygen is driven off, and will continue to be driven off so long as any remains, provided the hydrogen content of the atmosphere is maintained above the equilibrium value. Thus the formation or reduction of oxides is dependent on the temperature and the partial pressure of oxygen.

Temperature and pressure conditions to form or reduce oxides of the different metals vary widely. Some metals oxidize readily in the atmosphere at relatively low temperatures (the oxides of such metals have low vapor pressures). Other metals, such as gold or platinum, do not oxidize even at high temperatures, unless the pressures are greatly increased. These oxides have high vapor pressures. Some oxides may be readily reduced at relatively low temperatures; others, such as chromium and aluminum oxides, are exceedingly difficult to reduce.

Development of the laws governing these reactions and determination of the constants for various metals over the range of temperature and pressure, and in the presence of various combinations of gases, have occupied the attention of many investigators for a long time.

It is theoretically possible to reduce the oxides of all metals by controlling the partial pressure of oxygen by vacua or compression, as demonstrated in the mercuric oxide experiment, but the practical difficulties of securing high pressures or vacua are obvious. The result can be more readily obtained through the use of an easily oxidizable gas, such as hydrogen or carbon monoxide.

A clearer conception of the significance of this phenomenon may perhaps be obtained by considering the dissociation pressure of oxides. The dissociation pressures for oxides of different metals vary widely, of course, but the values for iron oxide in Table I will bring out the point it is desired to emphasize. The exceedingly high vacua required, even at relatively high temperatures, are far beyond the attainable.

Table I.—Dissociation Pressure in Atmospheres for Iron Oxide

Temperature, Deg. C.	Pressures in Atmospheres
327	$5.1 \times (10)^{-42}$
527	$9.1 \times (10)^{-39}$
727	$2.0 \times (10)^{-22}$
927	$1.6 \times (10)^{-13}$
1127	$5.9 \times (10)^{-11}$
1327	$2.8 \times (10)^{-11}$

It is a striking fact that the presence of a strongly reducing gas, such as hydrogen, lowers the partial pressure of oxygen to these exceedingly low values, and in effect is a pump of extraordinary capacity. Thus may be explained the basic principles involved in the oxidation of metals and the reduction of metallic oxides.

Hydrogen is the gas most commonly used for the reduction of metallic oxides, and many metallurgical processes depend upon its use. Conversely, it may be used in furnaces to protect metals from oxidation.

In electric furnaces of the metallic resistor type, the heat-producing arrangement has no effect on the chemical composition of the atmosphere. This makes feasible the use of atmospheres which may be controlled.

We may therefore imagine an electric furnace as immersed in a sea of air, consisting of 80 parts nitrogen and 20 parts oxygen, at a pressure of 14.7 lb. per square inch. To reduce a metallic oxide, the partial pressure of oxygen must be lowered from the enormous value represented by normal air at normal pressure to the exceedingly low value represented by the dissociation pressure of, for example, iron oxide. This is actually what takes place in an electric furnace with an atmosphere of hydrogen.

#### Application of Atmosphere Principles

In the early days of electric furnace development these facts were not appreciated, except possibly by scientific thinkers. The broad application of these principles has only recently come within the realm of possibility.

During recent years electric furnaces have been developed into large sizes, adaptable to many industrial uses, and have found a ready acceptance by users of such equipment.

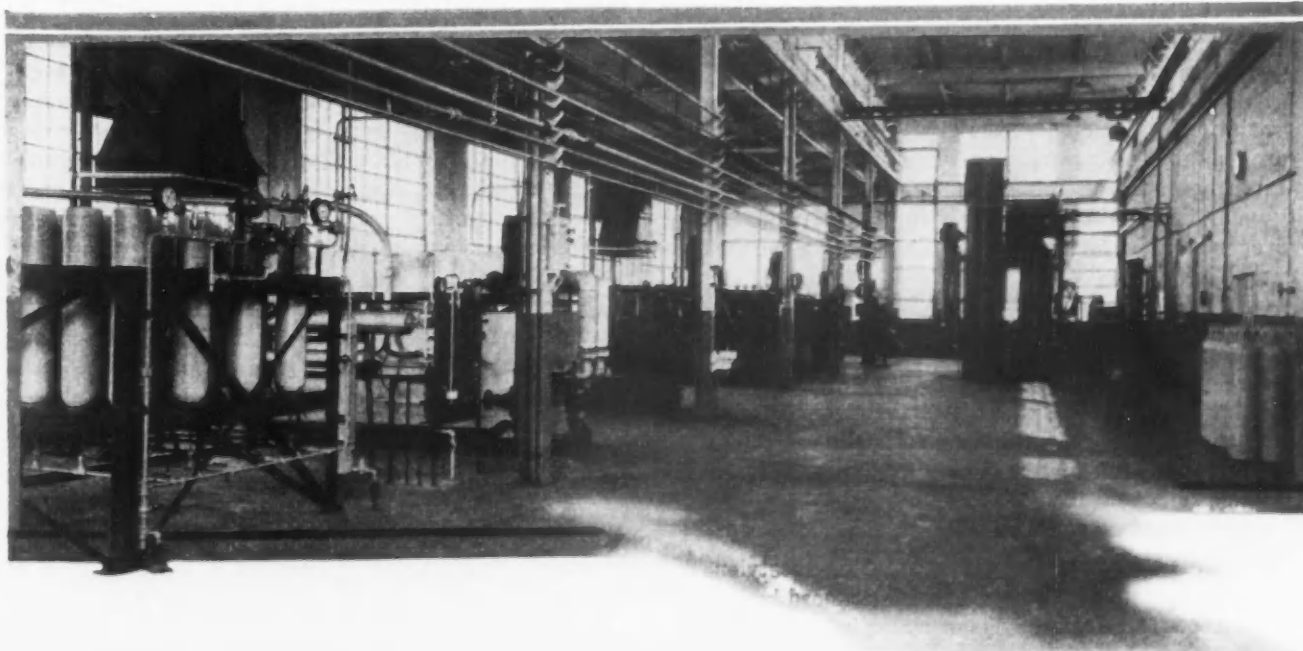
Special types have been built for special purposes, such as the copper brazing process previously referred to.

By means of this process a number of steel parts may be united into a complicated assembly, with dozens of joints, at one operation. The process is carried out in an atmosphere of hydrogen, or in an atmosphere in which hydrogen is present in substantial proportions. The process has made feasible certain assemblies which would be wholly impracticable by any other method.

Fig. 2 is a large continuous-type furnace for copper brazing. About

**FIG 2—Continuous Furnace for Copper Brazing, Consisting of a 20-Ft. Heating Chamber and 40-Ft. Water-Jacketed Cooling Chamber Continuous with It (Facing Page)**

**FIG. 3—Oxygen Plant. In right background is shown the fractionating column for separating liquid into oxygen and nitrogen**



one-third of the length consists of a heating chamber; the remainder is a water-jacketed cooling chamber. Thus the work is cooled nearly to room temperature in the atmosphere of hydrogen before it is discharged. This is one of a large group of furnaces for brazing and annealing, which utilize atmospheres of hydrogen.

Knowledge gained in developing and operating these furnaces, to which the study of atmospheres was incident, indicates that there may be many other processes in the metal industries to which furnaces with such atmospheres can be applied, with a resultant saving in the cost of products or an improvement in the quality. It may even make possible more new processes, such as copper brazing.

One handicap to the wider use of these furnaces is the practical difficulty of securing hydrogen. Hydrogen can be produced at low cost as a by-product from plants which manufacture oxygen in large quantities. But the cost of compressing it, added to charges for transportation and handling of containers, makes the final cost so high that it presents a serious obstacle to a wide application of furnaces which would require hydrogen in considerable quantities.

Hydrogen is required also for operation of atomic hydrogen welding equipment. These potential demands for hydrogen have prompted a study of methods of producing it and of the possibility of improved methods or sources of supply.

This has led to the development of apparatus for dissociation of ammonia into its constituent gases, hydrogen and nitrogen, and for the dissociation of hydrocarbon gases, such as butane, natural gas or city gas, into a product consisting largely of free hydrogen. This latter product has been given the name "Electrolene."

#### Use of Nitrogen as a Diluent

Nitrogen may be used with hydrogen in furnace atmospheres, reducing the cost somewhat, as well as the inflammability. It is inert to metals and oxides and thus acts simply as a diluent. It is a substantial component of dissociated ammonia gas, and is present in small proportion in dissociated city gas. It is not an essential element of furnace atmospheres.

Oxygen is used in large quantities for oxy-acetylene welding and cutting operations. It is produced by two usual methods: (1) electrolysis of water into hydrogen

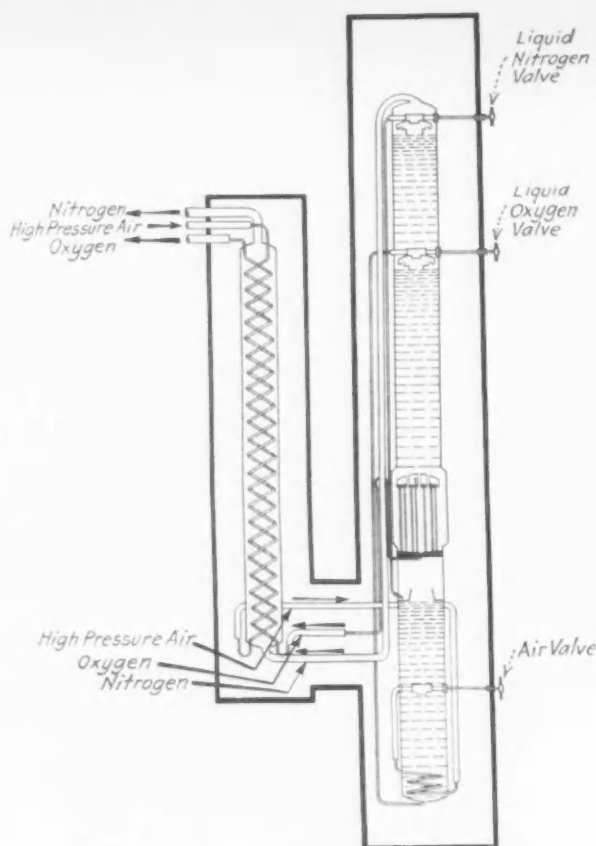


FIG. 4—Diagram of Heat Exchanger and Fractionating Column for Separating Liquid Air into Oxygen and Nitrogen

and oxygen, in which hydrogen is a by-product, and (2) liquefaction and fractionation of air, into nitrogen and oxygen, nitrogen being the by-product.

In the electrolytic process two volumes of hydrogen are given off to one volume of oxygen, and in the liquefaction process four volumes of nitrogen are produced to one volume of oxygen.

The electrolytic plant consists of a low-voltage generator supplying current to a group of cells containing water, to which sodium hydroxide is added to ionize the solution and increase its electrical conductivity. Hydrogen is collected at one terminal of the cells and oxygen at the other.

The liquefaction process consists of a multi-stage compressor, to compress air to about 3000 lb. per square inch, from which it passes through a heat exchanger to a fractionating column. Here the sudden release of pressure liquefies it and it is boiled off into nitrogen and oxygen. Both processes yield gases of high purity.

(To be concluded)

### Protecting Steel with Phosphates

Some experiments carried out by Jean Cournot and Jean Bary and described in a note presented in June to the Académie des Sciences (Paris) had for their object the determination of the protection against corrosion given to soft steel by a covering of metallic phosphates applied by immersing the steel in hot concentrated solutions obtained with phosphoric acid and iron and manganese, manganese and zinc and zinc and iron. The corrosive tests were those of salt vapor and sea water as adopted in French aeronautical practice.

The results showed that corrosion began with the steel alone after 1½ hr., after 5½ hr., when the steel was covered with phosphate of iron, after 8½ hr. with phosphate of zinc, and after 22½ hr. with phosphate of manganese. With combined solutions of zinc and iron, the corrosion began after 22½ hr., with zinc and manganese after 70 hr., and with manganese and iron after 70 hr. The protection afforded by phosphate of iron was shown to be illusory, and that the best results were obtained with the mixed solutions which greatly retarded the beginning of the corrosive attack.



# Galvanizing Furnace Using Both Direct and Indirect Heating

By HARRY E. GILBERT

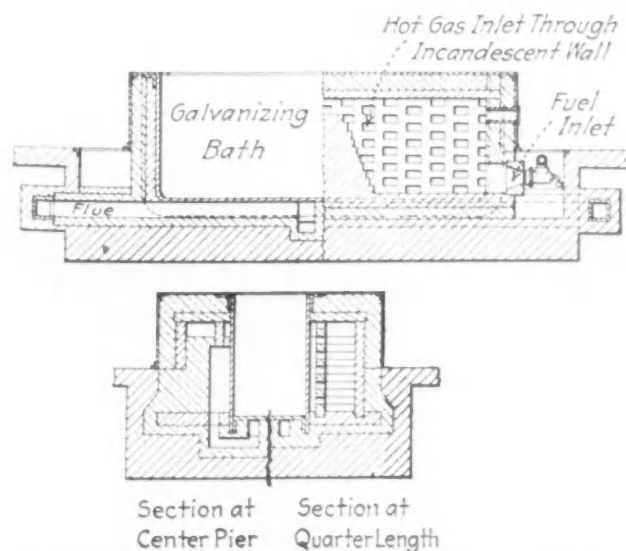
Chairman, Harry E. Gilbert & Son, Inc., Combustion Engineers,  
Bridgeport, Conn.

SOME 20 years ago the writer came to have a practical knowledge of hot-dip galvanizing under conditions favorable to a study of the problem from a production standpoint. He was at that time employed in a plant operating 23 hr. out of a possible 24 hr., and production was carried to a maximum. Therefore when, in later years, the subject of galvanizing furnaces claimed his attention, it was in the light of this earlier and practical experience.

In the plant of Witt Cornice Co., Cincinnati, there was installed four years ago a galvanizing furnace of the type here illustrated. The kettle itself is of ordinary firebox or flange steel, of general dimensions: 42 in. wide, 54 in. deep and 14 ft. long, all inside. The general arrangement of the furnace is as illustrated, and the method of firing is as shown in the sketches.

## Heat-Equalizing Members Used

Protecting and heat-storage walls are of silicon carbide compound in the form of bricks of standard size and shape. This is the first time silicon carbide compound has been used in this manner and for the same purpose—that is, to protect the kettle from the direct action of the flame or heat centers



Sections Through the Furnace, Showing Its General Character and Make-up and How the Hot Gases Are Led Through Various Passages

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**C**ONCURRENT use of radiation, convection and conduction, in heating a galvanizing kettle, is believed to extract most of the usable heat from the fuel. This description of a furnace designed to utilize all three methods of heat transfer shows a unit which has had the test of commercial operation. As such, it should be suggestive of what can be obtained when one goes after it.

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from the source of heat, and to store and diffuse the heat in the wall, thus to supplement the heat storage of the kettle and its contents.

Hot gases passing from the combustion chamber through openings in the walls of siliceous material heat those walls to incandescence. This serves to heat the kettle by radiation, in addition to the use of conduction in heating the kettle by the direct action of the hot gases themselves. Meanwhile convection operates on the contents in the kettle. Employment of all three methods of transmitting heat is believed to extract heat from the gases to an unusual degree.

Results compared with all previous methods with which the writer is familiar seem to show the advantage of both the method and the materials employed.

In the entire period of four years, this kettle and furnace have been continuously under fire, with the exception of one short interval when, for the purpose of test and examination, the kettle was emptied of its contents. It was found to be in perfect condition. This was some 16 months after it was first put into operation.

During the entire four years, with small periods as the exceptions, this kettle and furnace have been operated at a constantly increasing daily, weekly, monthly and yearly tonnage, reaching a maximum during the early part of 1930, when the following records were made:

Hourly tonnage, continuous for periods up to 5 hr., 5 net tons of production.

Daily tonnage, up to 37 tons.

Weekly tonnage, maximum, up to 200 tons.

(Concluded on page 827)

# Union Heaters—Production Methods and

**T**HIRTY or more years ago the mention of the name "unit heater" to a plant owner or manager required an elaborate explanation. To sell him such a device called for much persuasion, as well as a very liberal guarantee, before he would risk the comfort and safety of his plant to the uncertainty of this new idea. So used was he to the sight (and sound) of radiation coils strung along the walls that the idea of obtaining a uniform temperature throughout the building by concentrating the radiation at one or two points, and forcing an air circulation over it, could not readily be visualized.

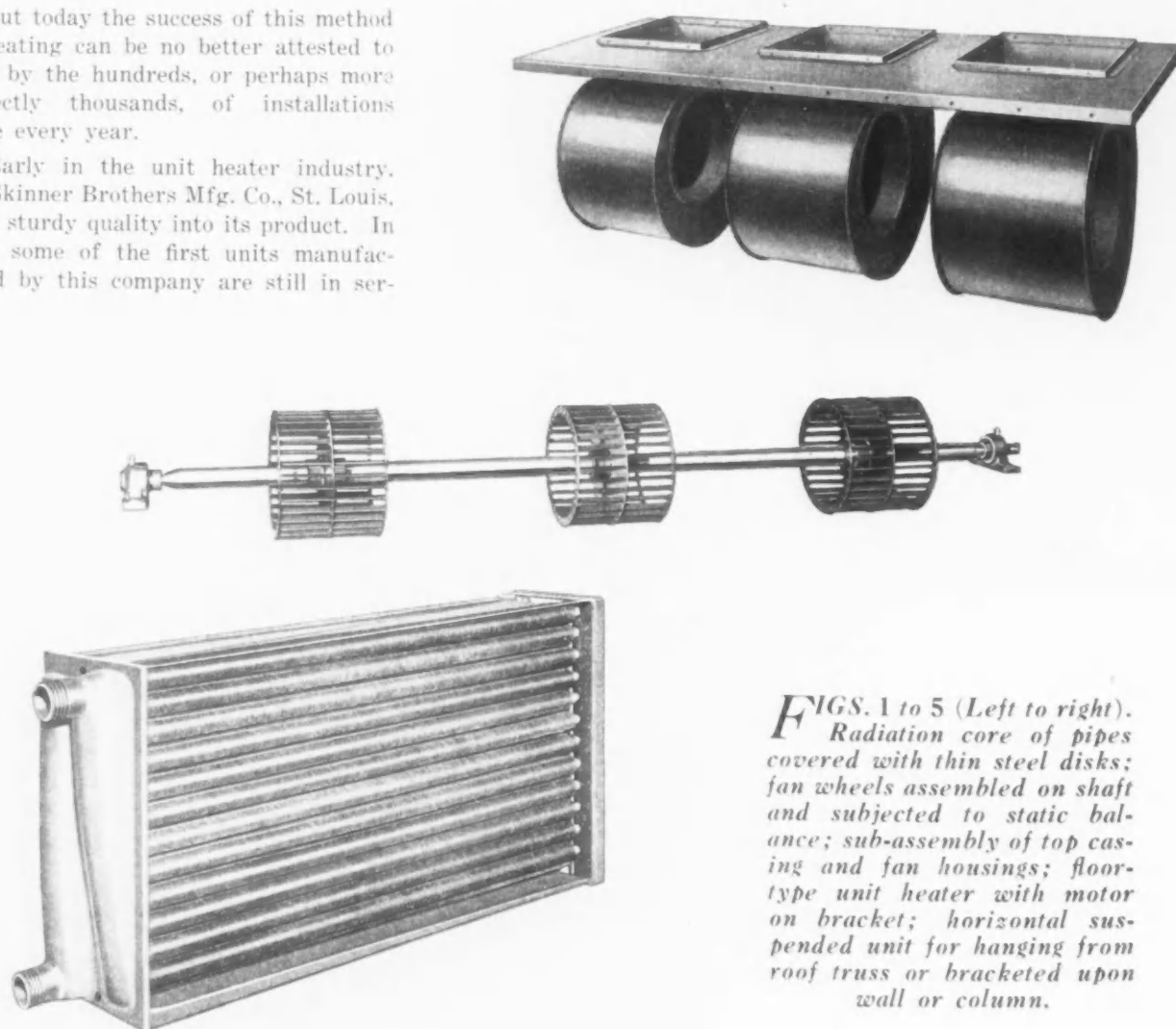
But today the success of this method of heating can be no better attested to than by the hundreds, or perhaps more correctly thousands, of installations made every year.

Early in the unit heater industry, the Skinner Brothers Mfg. Co., St. Louis, built sturdy quality into its product. In fact, some of the first units manufactured by this company are still in ser-

**O**NE useful piece of equipment in a manufacturing plant, although it must be classed as non-productive, is a device for heating, thus making the plant a comfortable place to work in cold weather and at the same time providing atmospheric conditions conducive to best manufacturing results. Manufacturing methods used by one pioneer maker of unit heaters for industrial application are briefly outlined in this article. And suggestions are made for greater usefulness of such equipment.

vice. Although crude in appearance when compared with more recent heaters, these earlier units followed a sound principle, which has been the model of the various types later developed.

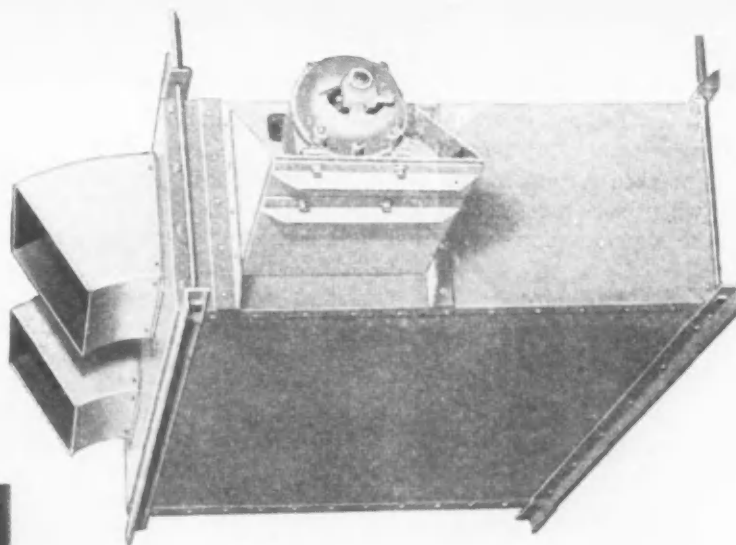
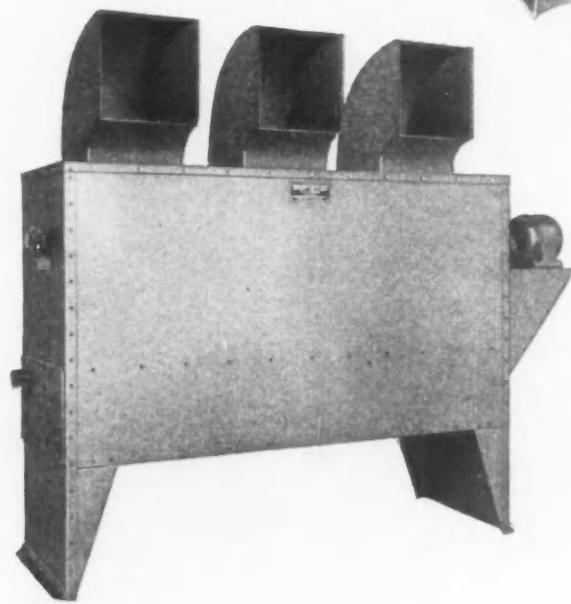
In principle, the unit heater transmits the heat, contained in the steam, to the air which comes in contact with the radiating surfaces, and circulates this heated air rapidly by mechanical means until a uniform temperature is obtained through the room. The heated air is discharged at such height above floor



**FIGS. 1 to 5 (Left to right).**  
Radiation core of pipes covered with thin steel disks; fan wheels assembled on shaft and subjected to static balance; sub-assembly of top casing and fan housings; floor-type unit heater with motor on bracket; horizontal suspended unit for hanging from roof truss or bracketed upon wall or column.

# Applications

By PAUL HOMER WHITE  
*Mechanical Engineer*



level that it will not come in direct contact with workmen standing near, and thereby cause discomfort.

In approximate figures, a pound of steam condenses into a pint of water. In so doing, it gives up 1000 B.t.u. of heat to the surrounding air. This heated air, forced to move at a high velocity by the action of a fan, induces a secondary flow—that is, the air stream from the outlet drags some of the adjacent air along with it, and gradually the entire mass of air within the room is brought into circulation. Except for what is lost through leakage around doors, windows, elevator shafts and other openings, this air all finally returns to the fan and is again forced through the heating coils. This action can be clearly demonstrated by introducing a dense smoke into the air just before it enters the fan, and tracing its circulation until the smoke becomes evenly diffused throughout the room.

## Standardized Parts Are Interchangeable

As carried on at the Skinner Brothers plant, the manufacturing process is divided into various departments, each of which functions independently of

the others. All detail parts which go to make up the heaters are standardized and interchangeable, so that the individual parts can be made up and stored in a comparatively small space until required for a complete assembly.

The "heart" of the unit is the radiation core, which is illustrated in Fig. 1. This assembly consists of a nest of  $\frac{3}{4}$ -in. standard steam pipe coils formed into hairpin bends and welded into a common header plate. Before assembling, however, each of these coils is covered with a series of equally spaced thin steel disks, which serve to multiply the radiating capacity of the bare pipe. The disks are pressed on by a specially developed process, after which the coil is given an acid bath to remove all grease and scale. This is followed by a tinning operation which coats the entire surface both inside and out, thus securely bonding the disks to the pipe, and also adding to their resistance against corrosion.

After the holes are punched into the header plate, the latter is placed in a holding fixture while the coils are assembled and welded into place. The complete set of coils is assembled before the welding is begun. At the completion of this operation, the header caps are welded on and the supporting frame attached. This completes the unit, which is now ready for the hydrostatic test. If any leaks appear, they are marked and repaired immediately, after which the coil is retested. After it is passed by the inspector, it is sent to finished storage.

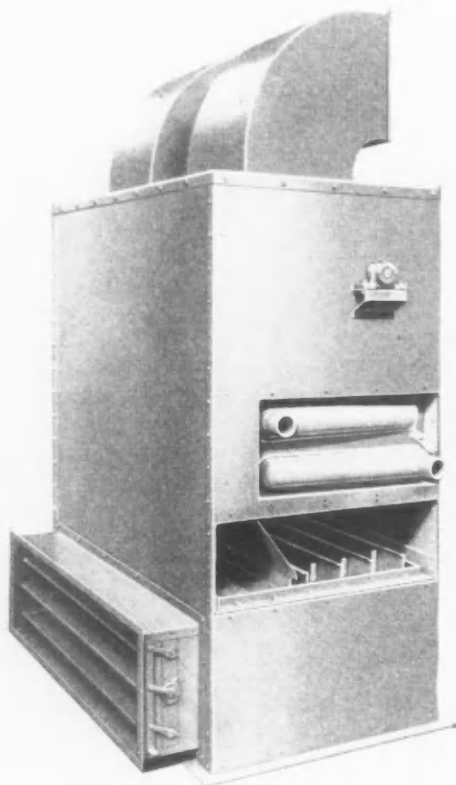
## Fans Balanced Dynamically Before Assembly

Next in importance are the multiblade fans which circulate the air over the radiation core and distribute it throughout the room. Although the fans must be made on a production basis, no trouble is spared to hold each wheel to a high degree of accuracy. The individual blades are punched and formed, after which they are machine riveted to the center disk and the



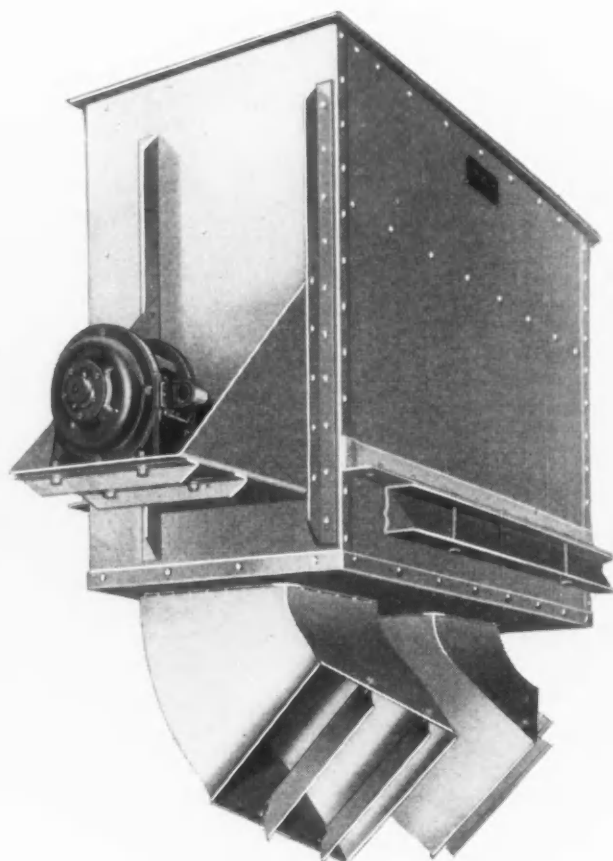
end rings. An accurately finished hub attaches to the center disk. Each wheel is statically balanced before being sent to storage.

When a set of wheels is requisitioned for assembly into a heater, the set is mounted upon its own shaft and this assembly is dynamically balanced. Each wheel is marked for its correct position on the shaft, so that, when later reassembled into the heater, it will occupy the same position as when being balanced.



**FIG. 6**  
(Right).  
*Inverted unit  
suspended  
from above*

*Fig. 7 (Left).  
By-pass unit  
with dampers  
under thermo-  
static control,  
used for venti-  
lating*



The fan housings are made into a subassembly with the top casing. The discharge opening is of sufficient size to allow the wheels to pass through for assembling. All parts of the housings, as well as the attachment of housings to the top casing, are joined by electric spot welding. This subassembly is shown in Fig. 3. It will be noted that the top casing is flanged all around. This is done to stiffen the sheet, and also to provide a means of fastening to the end and side casings. At each housing outlet also is attached a flange around the opening, which is used for securing the air diffusing outlets.

All sheets are cut to exact size, after which they are gang punched for bolt and rivet holes, and the various openings are cut out. The top and end sheets are then flanged, after which they are ready to be placed in finished storage.

#### Various Types Made from Standard Parts

All standard sizes are made up in three different arrangements, which allow for a wide variety of applications. The floor unit illustrated in Fig. 4 is used in buildings where there is an available space

along the walls, or in front of columns or partitions. Where floor space is at a premium, the horizontal or inverted types shown in Figs. 5 and 6 are used. These may be bracketed upon walls or columns or suspended from roof trusses. The detail parts are the same in each type, with the exception of motor brackets and suspension arrangements.

In the construction of these heaters, electric welding plays a large part. When one considers the great

number of steam-tight joints which must be made, it is evident that some very dependable as well as economical means must be employed. Electric arc welding in the hands of a skilled operator amply fulfills this condition. For many of the lighter sheet metal parts, such as fan housings and outlets, electric spot welding is used.

In the complete assembly of the casings, and the attachment of the various brackets and other supporting members, riveting is used throughout except for certain parts which must be removable. For example, the top casing with fan housings attached is bolted, as is also the cover plate over the coil opening in the end casing.

The adaptability of these various types makes possible almost any installation arrangement which might be desired. One of the many useful applications of these units is in roundhouse heating. Here is a case where a large space must be heated to a comfortable working temperature. A great amount of leakage is always encountered, and often the building is so located—away from any nearby structures—that it has

(Concluded on page 827)

# Cold Rolling Raises Fatigue or Endurance Limit

By G. S. von HEYDEKAMPF, Dr. Ing.

*Engineer of Tests, Babcock & Wilcox Co., Bayonne, N. J., and Formerly Assistant to Prof. O. Foeppel, Brunswick, Germany*

**D**URING the last ten years much work on the fatigue properties of metals has been done at the Woehler Institute, under the direction of Prof. O. Foeppel, who is head of this laboratory in the technical high school (University) of Brunswick, Germany. Besides the usual determinations of endurance limits the elastic behavior of materials has been investigated, paying special attention to the mechanical hysteresis effect for ranges of stress within the elastic and fatigue limits. To this mechanical hysteresis effect the names "dynamic ductility" and "damping capacity" have been applied. Since 1927 a long series of tests has been carried on, studying the influence of surface and surface damage on fatigue strength. These experiments have led to the development of a new method of machining highly stressed machine parts which is briefly described in the present paper.

## The New Surface-Finishing Method

This method consists in cold-rolling or compressing the surface of highly stressed machine parts after, or in lieu of, grinding. The process has been applied, previous to the time of Foeppel's tests, for finishing railroad car axles, and was first used in Sweden, according to Bonte. A similar method is the "press-finishing" for smoothing the inner surface of drilled holes to be used as bearings for pivots. The two types of cold work finishing just mentioned are, however, merely intended to reduce the coefficient of friction for bearings by means of a simple and inexpensive machining process. The idea of compressing the surface in order to obtain increased fatigue strength has, for the first time, been developed in the Woehler Institute.\*

\*The effect of cold work on fatigue strength has been discussed by McAdams and in Bulletins 124 and 152 of the Engineering Experiment Station of the University of Illinois.

The tests summarized in the present article were made on cylindrical specimens, all of them polished, and some of them cold-rolled after polishing by means of the apparatus shown in Fig. 1. This apparatus was used on an ordinary lathe, replacing the cutting tool, the procedure of compressing the surface being as simple as that of turning the specimen. The pressure on the surface of the specimen, *g*, is set up by three hardened steel rollers, *c*, *d* and *e*, and is adjusted by the screws *f*. The specimen *g* is rotated by the spindle of the lathe and causes the rollers to revolve also. A newer device recently used differs from that shown in Fig. 1 in having a device for controlling the compressive force. Both torsion specimens and flexure specimens were finished by means of this apparatus.

The form and size of the specimens used are shown in Fig. 2. By the rolling action, the surface of the specimen is cold-worked, and Fig. 3 shows the effect on a soft steel with a carbon content of 0.10 per cent, a manganese content of 0.50 per cent, and a tensile strength of 55,000 lb. per sq. in. The compressed part *a*, near the surface, extends to a depth of about 0.01 in.; *b* shows the normal structure of the steel. The Rockwell hardness values are B85 for part *a*, and B60 for part *b*.

In harder steels the influence of cold rolling on microstructure is not so clearly shown as in Fig. 3, and for such steels the difference in hardness between cold-rolled part and normal steel seems to be inconsiderable. The decrease in the diameter of the specimen is very small, and, since it never exceeded 0.003 in., or about  $\frac{1}{2}$  of 1 per cent of the diameter of the specimen, it was neglected in the test herein described.

## Testing Machines Used

The torsion fatigue testing machine used (Foeppel-Busemann) was of the inertia type, and is similar to the McAdam

**B**Y cold rolling the surface of machine parts the fatigue or endurance limit can be raised about 15 per cent. This is the contention of the accompanying article. It covers the results of torsion and bending fatigue tests on alloy steel made by Prof. O. Foeppel in the Woehler Institute, Brunswick, Germany. More recent tests have shown the same favorable effect of cold rolling on copper, bronze and the light metal, *Lautal*. In a second article the author will discuss a remarkable increase of the dynamic ductility, so called, measured by the mechanical hysteresis under stresses within the range of the fatigue limit.

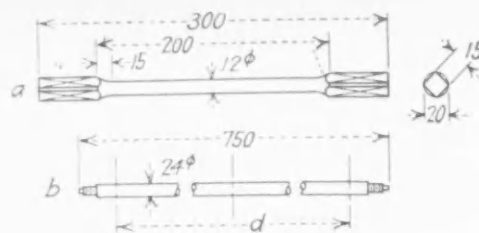
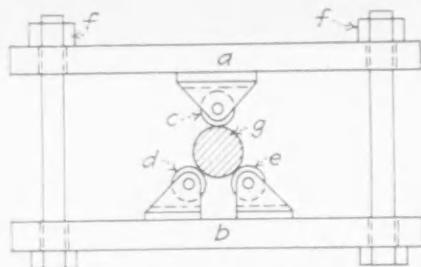


Fig. 1.—Apparatus for compressing (by cold rolling) the surface of cylindrical bars (Left)  
Fig. 2.—Specimens for fatigue testing: (a) Torsion specimen; (b) Rotating bending specimen; (d) Distance between the supports (670 mm.). All measures in millimeters

machine built in this country by Olsen. The solid cylindrical specimen, Fig. 2a, is stressed by the acceleration forces of a flywheel oscillating in the natural period of the elastic system, which is composed of the specimen and the flywheel. The oscillation is excited by a motor-driven crankshaft mechanism, the connecting rod giving small impulses to the free end of the specimen opposite to the flywheel. The twist in the specimen depends on the amplitude of the flywheel movement, which is measured while the machine is running. The relation between the measured angle of twist and the shearing stress in the specimen is determined from a stress-strain diagram previously taken on a special static torsion testing machine. Very close regulation keeps the motor driving the machine at a constant speed in order to maintain the amplitude of oscillation, which has to be adjusted to a determined value for each test. The number of revolutions of the motor is equal to the number of cycles of stress applied to the specimen, and is readily recorded by means of a revolution counter. During a cycle the stress varies between a maximum value and a minimum value of equal amount but opposite in direction.

For the bending tests a rotating-beam testing machine was used, the specimen (Fig. 2b) being supported at two bearings and loaded by a single weight at the middle of the span. To eliminate the disturbing influence of the direct pressure of the loaded central ball bearing a piece of hard paper was placed between the surface of the specimen and the inner race of the ball bearing. In this manner the pressure caused by the weight at the middle bearing is transmitted to the specimen over a comparatively large area. The failure is due to the bending stress, and is no longer appreciably affected by the direct pressure of the middle bearing.

#### Results of Torsion-Fatigue Tests

One series of tests was carried out on 10 specimens of a heat-treated steel obtained from

the Deutsche Edelstahlwerke Remscheid (Mark "Y"). The chemical composition was:

	Per Cent		Per Cent
Carbon .....	0.45	Chromium .....	1.05
Manganese .....	0.74	Molybdenum .....	0.18
Silicon .....	0.35		

The tensile test results were:

Yield point, 161,000 lb. per sq. in.  
Tensile strength, 173,000 lb. per sq. in.  
Elongation (gage length 5 diameters), 14 per cent  
Reduction of area, 55 per cent

Four fatigue specimens were tested "as received" (normally polished surface); the remaining six specimens were cold rolled before testing by means of the apparatus shown in Fig. 1. The results of these fatigue tests are given in the table. The four specimens, polished but not cold rolled, were run under an alternating torsional stress of 48,500 lb. per sq. in., and broke after the numbers of cycles given in the table.

Cold-rolled specimens Nos. 66, 67, 68 and 72 were first tested under an alternating torsional stress of 53,300 lb. per sq. in. (10 per cent higher stress than the non-cold-worked specimen), and did not break after the numbers of cycles given in the table. Then another 10 per cent increase of stress was applied, bringing the stress up to 59,700 lb. per sq. in., and failure occurred after the numbers of cycles given in the table. No specimen withstood as many as one million cycles of this 59,700 lb. per sq. in. stress.

The load on specimen No. 73 was maintained at a nominal value of 53,300 lb. per sq. in. until a fracture occurred after about 75 million cycles of stress. Due to a change in energy absorption during the test, specimen No. 74 ran for one night with an unintentionally increased stress up to about 58,000 lb. per sq. in., which accounts for its failure after 2 million cycles of a stress which was nominally, but not actually, 53,300 lb. per sq. in.

It seems evident that the endurance limit for the specimens polished but not cold-worked was less than 48,500 lb.

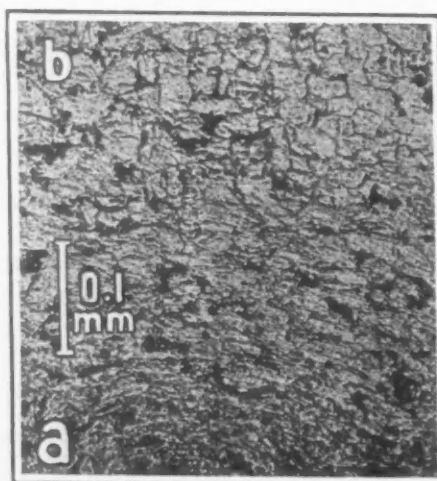


Fig. 3.—Cold working the surface is shown in the microstructure: (a) Cold-worked zone; (b) Normal microstructure



per sq. in., and that the endurance limit for the cold-worked specimens was very close to 53,300 lb. per sq. in., since several of the cold-rolled specimens withstood several million cycles of stress without fracture, and the one specimen which fractured at this stress (specimen No. 73) ran over 74 million cycles before fracture. It seems a reasonable conclusion that for the material tested the increase of endurance limit due to the cold rolling was between 10 and 15 per cent.

The reproductions in Fig. 4, show the fractures of three specimens of a high quality crankshaft steel. The specimens were of the type shown in Fig. 2b, and in each fracture three zones are to be distinguished:

- (1) A very light colored, elliptical area with a small central dot.
- (2) A lens-shaped region surrounding (1) and slightly darker in color.
- (3) The remainder of the cross-section which is still darker. Parts (1) and (2) show the extent of the fatigue cracks.

The machine is stopped by an automatic release for the motor switch which was set to operate when the deflection of the specimen increased by a small amount (0.004 in.) from its original value, and before the fatigue crack had spread to complete fracture of the specimen. The partially fractured specimen was then removed from the machine and pulled apart in tension. Usually the fatigue-cracked surface is quite different in appearance from the part broken by the final tension.

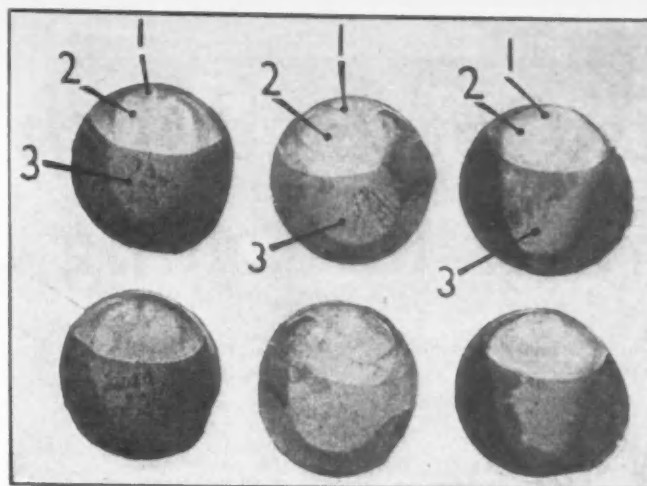


Fig. 4.—Bending fatigue failure starts from small interior inclusions:

- (1) Fatigue break, first state (with the inclusion);
- (2) Fatigue break, second state; (3) Static break, produced by pulling the partially broken specimens

Specimens shown in Fig. 4 were all cold rolled after polishing, and it will be noted that the fatigue failure seems to have started from interior small slag inclusions, rather than from the surface. The nuclei (region 1 in Fig. 4) seem to be in the center of a small elliptical area, and it is to be noted that the progress of the crack is slower toward the compressed, cold-rolled part of the cross-section, although the stress is highest there. After reaching the surface of the speci-

men, the crack seems to spread faster, as shown by the coarsened grain of the part marked 2 in Fig. 4.

The inclusions which, apparently, are the nuclei for the start of the fatigue cracks have a diameter of 0.003 to 0.004 in., and are located at a distance of approximately 15 per cent of the radius from the external surface of the specimens. In a specimen polished but not cold rolled, the crack begins at the surface (or possibly a very minute distance below it) on account of the very small notches or grooves always left by the grinding or polishing of the specimen.

In the cold-rolled specimens, shown in Fig. 4, the influence of surface notches seems to have been eliminated by the cold rolling, and the fatigue crack no longer starts from the surface, but from a point below it. Presumably the point where the crack starts is from some point of localized weakness, in this case probably a small slag inclusion. In a fatigue test of a non-cold-rolled specimen these inclusions, even at the surface, are no more dangerous as a

#### FATIGUE TEST RESULTS FOR REVERSE-TORSION TESTS

Specimens of steel "Y" obtained from the Deutsche Edelstahlwerke Remscheid, heat-treated to give a tensile strength of 173,000 lb. per sq. in.

Specimen, No.	Surface Condition	Maximum Shearing Stress (Torsion) During a Cycle <sup>1</sup> Lb. per Sq. In.	Number of Cycles for Fracture
65	Polished but not cold-rolled	48,500	2,083,000
69	do.	48,500	1,139,000
70	do.	48,500	439,000
71	do.	48,500	1,165,000
66	Polished and subsequently cold-rolled	53,300	2,243,000 *
67	do.	53,300	3,659,000 *
68	do.	53,300	2,770,000 *
72	do.	53,300	3,247,000 *
73	do.	53,300	74,816,000
74	do.	53,300	2,161,000 †
66 <sup>2</sup>	do.	59,700	441,000
67 <sup>2</sup>	do.	59,700	771,000
68 <sup>2</sup>	do.	59,700	399,000
72 <sup>2</sup>	do.	59,700	710,000

<sup>1</sup> Cycles of completely reversed torsion applied to specimens.

<sup>2</sup> Specimen was accidentally overstressed to about 58,000 lb. per sq. in. during night, thus causing early failure.

<sup>3</sup> Retest of unbroken specimens at higher stress than first test.

\* Specimen did not fracture.

# Results Obtained with Roller Bearings in Rolling Mills

By G. E. PALMGREN  
S. K. F. Industries

ROLLER bearings in America were first adopted for large continuous mills for rolling thin sheet steel. In Europe, on the other hand, small hot rolling mills were first fitted with roller bearings. Since the running conditions are rather different in these two kinds of rolling mills, and the work which has been carried out in Europe in this field is probably little known in America, a description of what has been done abroad might be of interest.

One of the largest steel works in Czechoslovakia commenced in 1921 to carry out tests in rolling mills with SKF double-row spherical roller bearings. The first designs independently carried out by this firm gave good results, which clearly showed the superiority of roller bearings in comparison with plain bearings. But, owing to constructional details and other causes, this pioneer work did not develop rapidly.

During 1922 the SKF organization began to take up the question in earnest at the Hofers Steel Works in Sweden. From that time the development has proceeded uninterruptedly and resulted in the present designs. During this experimental work everything was done to produce the best solution of the problem.

## Controlling Factors Outlined

Before describing the design, some of the factors will be emphasized which must be taken into consideration in the design and application of roller bearings in general, and particularly for rolling mills, where the running conditions in many respects are especially unfavorable.

1.—The bearings must have such a carrying capacity that there is reason to expect a satisfactory life. It is not, in this case, sufficient to take the catalog ratings as a basis, because the various parts of the bearing are subjected to fatigue in such a manner that it is not possible to speak of

the carrying capacity of the bearing without also at the same time mentioning the desired life.

That this is really the case will be seen from Fig. 1. This shows the relation between bearing load and probable life in millions of revolutions in case of rotating inner race of a certain spherical roller bearing.

For instance, in a wire rolling mill or strip mill, where the load is relatively continuous, it is not possible to permit the same specific bearing pressure as in a blooming mill or roughing mill, where the time for the effective load is short.

2.—It will be seen from the above that it is of great importance to know completely the conditions obtaining in each case. Since, as a rule, the pressures vary with respect to magnitude as well as time, within fairly wide limits, we must consider not only certain maximum loads but also the variation in pressure.

3.—It is of greatest importance that the whole bearing application be carried out in such a way that the distribution of load within the bearing, which has been assumed in the calculation, obtains in reality. If the application is made rigid, without any possibility for it to adapt itself to deflections of the neck or other skew positions, loads will be created in certain parts of the bearings which will shorten the life of the bearings, often disastrously.

4.—The design must be such as to permit the use of roll necks of adequate diameter.

5.—To prevent any wear of the necks and bearing seats, the bearings must have press fit on the necks.

6.—Changing of the rolls must not take up more time than when plain bearings are used.

7.—It must be possible for adjustments of the rolls to be effected quickly, and so that the rolls are guided with exactness. They must also be adjustable

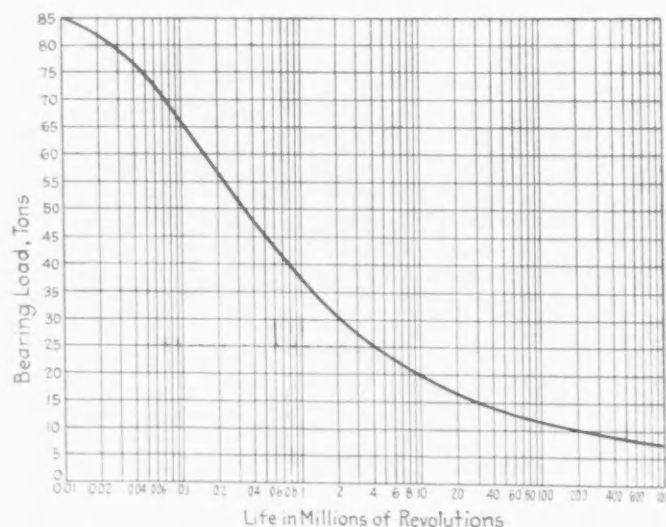


Fig. 1.—Relation Between Bearing Load and Life of a Self-aligning SKF Roller Bearing with Rotating Inner Ring. One bearing out of ten is reckoned as breaking down after number of revolutions indicated. Average life is about three times as long

without risk of overloading the bearings through carelessness or through heat expansions of the rolls.

8.—The bearings must not be susceptible to damage through breakage of the rolls.

9.—It should be possible to fit roller bearings to existing rolls and in existing stands.

As the SKF manufacture includes all types of bearings, cylindrical, tapering and spherical roller bearings, the company was in position to choose any design. The reason why spherical roller bearings were chosen was that these bearings, within a certain available space, can be designed so as to give the highest carrying capacity. Another reason was that this type bearing makes possible an automatic adjustment, so that the distribution of load in the bearings under all conditions will be uniform. Therefore the real carrying capacity and the life, it is believed, must be decidedly superior.

#### *Two-Bearing Design for Ordinary Hot Rolling Mills*

**S**INCE the neck diameter must be heavy and the roll as a rule should have as small a diameter as possible, the space available for the bearings will be limited. To obtain sufficient carrying capacity, it will then be necessary to place two spherical bearings side by side. Fig. 2 shows a roll and a section through the bearings.

Radial pressure is carried by two spherical roller bearings (7), but a condition making such an arrangement possible is that the bearing housings at the same time are supported in such a way that they can easily adjust themselves to the necks with a minimum of resistance. If this is not done, one of the bearings may have to carry the entire load and the life might therefore be reduced to a trifle. The method of placing the bearing housing in a spherical seating, in the same way as is done with a double-

▲ ▲ ▲

**A**ERICAN engineers have been active in fitting anti-friction bearings on heavy machinery, notably rolling mills. Meanwhile, European engineers have not been idle. This article tells something of how they have attacked the problem.

▼ ▼ ▼

row rigid groove bearing in an adjusting ring, has not been considered sufficient, because in the seating surface there will be great frictional resistance against the alinement when the neck deflects under load.

As an alternative, therefore, knife edges (8) of hardened ball-bearing steel supported against hardened steel washers fitted in the bearing housings and in the frames are used. The bearing housing can freely swivel on the edges like a balance, and at the same

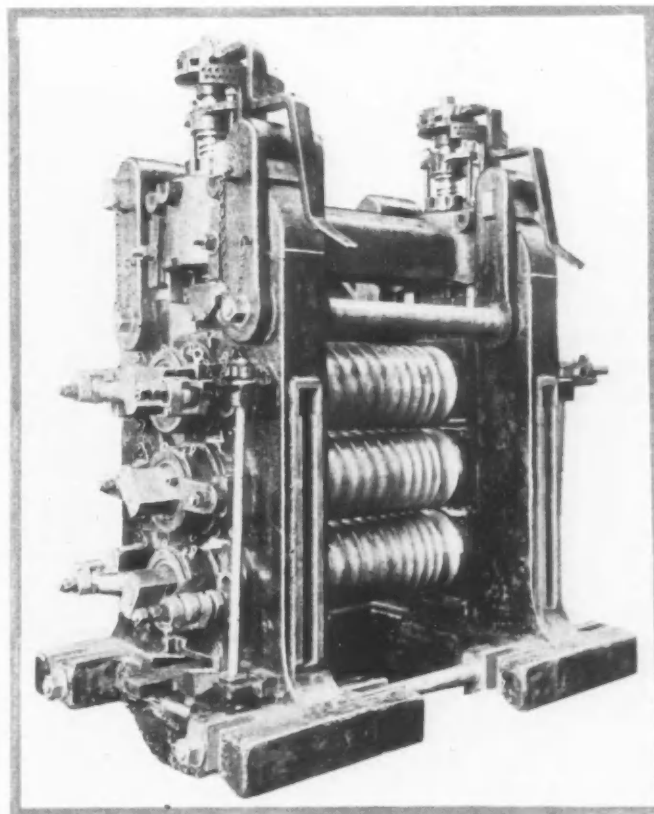
time it remains freely movable in axial direction, owing to the cylindrical design of the supports (9), and can roll against the flat washers in the stand. The steel edges are given such dimensions that the stresses in them will be only half of the corresponding values of the roller bearings subjected to heavy fatigue.

#### *Two Bearings Form One Unit*

Both bearings are mounted on a common sleeve fitting on a taper neck and, together with a housing and cover, form a unit. They are well protected against dust and dirt, even when rolls are changed. The tapering sleeve which is driven on to the roll neck effects the press fit necessary for preventing the inner races of the bearings from turning around on the

neck and wearing it. At the same time it is possible, with a few strokes on a specially made wedged tool driven in between the body of the roll and the sealing ring, to loosen the bearing from the neck.

Using two self-aligning bearings placed close to one another does not involve a departure from the principle of the self-aligning bearing. The bearing housing, as already pointed out, is so made that it can freely adjust itself according to the bearings or the neck respectively. If both bearings are not exactly alike, but one has not quite the same height of section as the other (Fig. 3), the bearing housing, while self-



*Fig. 5.—Three-High 14-In Stand. View from the side on which the bearings effecting lateral guidance are fitted*



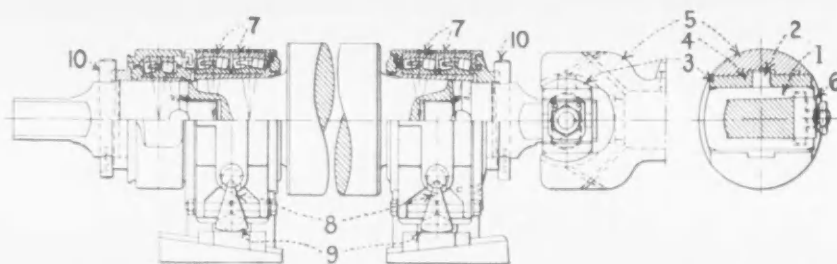


Fig. 2.—Section Showing Bearings for the Bottom Roll, the Lengthening of Old Rolls, and the Universal Coupling

adjustment is taking place in the bearings, automatically turns far enough for both bearings to obtain the same load and for equilibrium to be obtained.

One essential, however, is that the outer race should be able to move slightly, axially, in the bearing housing. The design, therefore, enables the pressure to be uniformly distributed over four rows of rollers, which is not possible in other designs. And, partly owing to the four rows of rollers and partly to the uniform distribution of pressure, it insures a maximum carrying capacity or life within the available space.

Axial loads in both directions are taken up by other spherical roller bearings, mounted one on each roll on the same side of the frame. The roll is therefore fixed axially at one end; and the bearing at the other end may move with complete freedom sideways. The bearings are so mounted that by means of a key (10 in Fig. 2) that passes through the roll-neck they can be either fixed to or removed from the rolls in a simple manner, and without in any way being exposed to dirt.

#### Taking Care of Axial Thrust

The use of separate self-aligning bearings for taking up the axial load was rendered desirable by several circumstances. The axial load is as a rule comparatively insignificant. Nevertheless it would be great enough to shorten perceptibly the life of the bearings that carry the radial load, if they had to deal also with the axial load. Separate bearings for the axial load have therefore been considered necessary for stands in which the rolling is done in grooves. In strip rolling mills, on the other hand, they are not necessary.

To permit easy adjustment of the radial bearing housing, the axial bearing housing must be quite independent of the former, and may

therefore also have to carry small radial loads which are injurious to an ordinary thrust bearing.

Another important reason why self-aligning roller bearings are used is that an ordinary double-acting thrust bearing can easily become unevenly loaded when lateral adjustment takes place. Where the adopted design is employed, however, the self-aligning property of the spherical bearing is so utilized that the

lateral adjustment is particularly simple and very convenient.

Fig. 4 shows the thrust bearing housing as viewed from above. This housing is provided with two spherical joints (1) one of which is secured by means of a bolt (2) passing through it and fixed in a vertical T-groove. The other joint may be moved axially

by means of an adjusting screw. The roll can therefore be adjusted laterally in both directions by means of only one screw, the bearing housing executing a rotary movement around the fixed joint when this is done.

The outer ring of the axial bearing is made in two parts, thus enabling axial adjustment to be effected, and the roll to be

accurately guided laterally without play. The design as a whole is such that the bearings cannot be damaged by careless or incorrect adjustment of the rolls.

When the roll is raised or lowered during rolling, no disturbance of the axial adjusting screws is necessary, for the center of the axial bearing can freely move up and down within certain limits. The axial

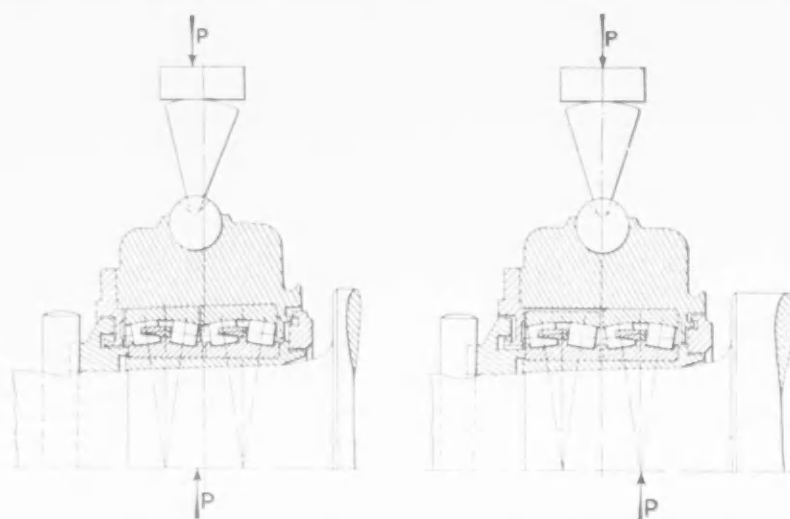


Fig. 3.—Distribution of Pressure in the SKF Two-Bearing Design Is Always the Same

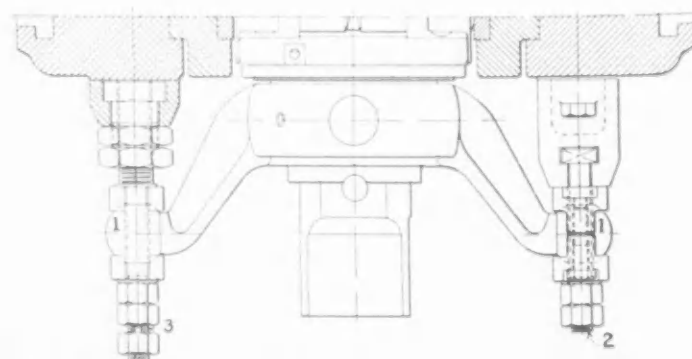


Fig. 4.—Top View of a Bearing Housing for Dealing with Axial Pressure at One End of the Roll, with Device for Lateral Adjustment

bearing housing then revolves around an axis running through the centers of both the spherical joints. Variations in the temperature and longitudinal expansion of the roll make no difference to the bearings

holding the roll in position laterally when plain bearings are used.

In the roller-bearing design described, only one roll-neck is guided laterally. The bearing on the other

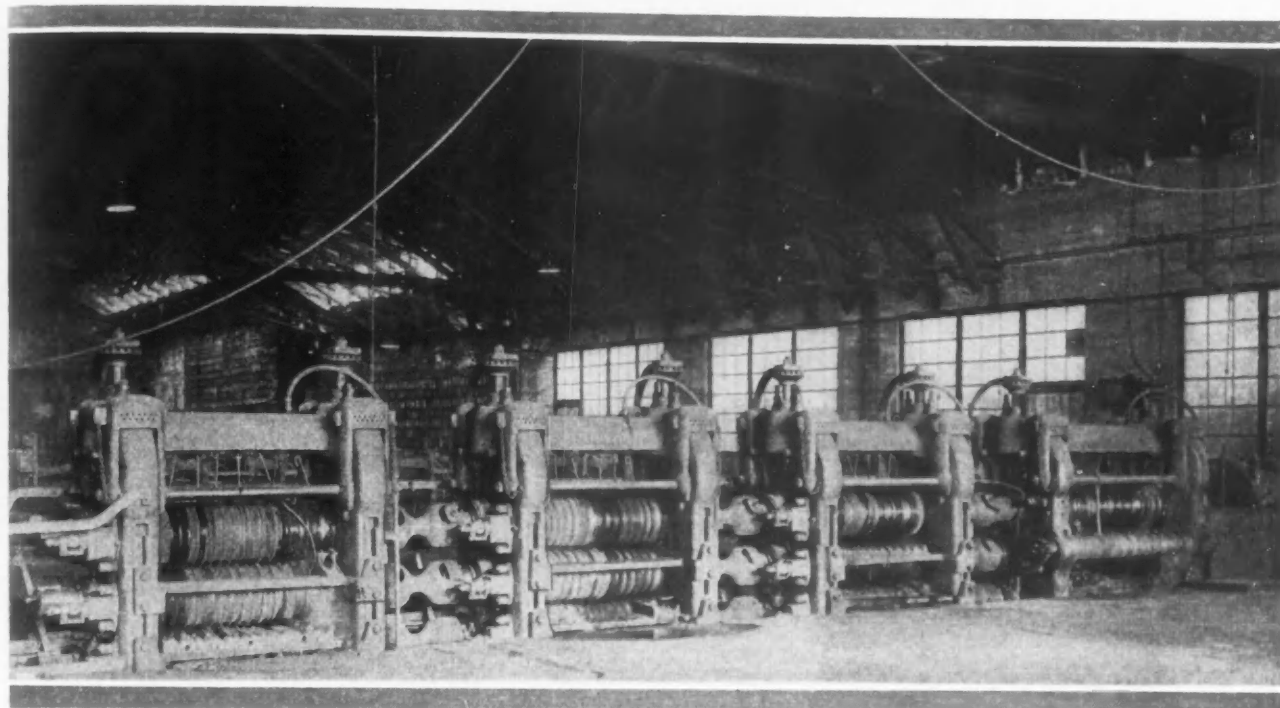


Fig. 6—Three-High 18-In. Rolling Mill with SKF Roller Bearings

or to the adjustment of the grooves, which remain constant.

#### Bearing Safe Against Roll Breakage

Other advantages have been obtained, also. Occasional fracture of the rolls in rolling mills cannot be avoided. The roll breaks into two parts, and the fractured surfaces are generally oblique. Both halves of the roll move with great force toward the sides of the housing, and in so doing rupture some of the parts

neck is entirely free, and can move to some extent with the broken half of the roll. No great pressure, capable of destroying the bearing, therefore arises. Experience gained through a number of roll breakages shows, moreover, that the bearings are in no danger from this cause.

The design described above is employed in a number of rolling mills of various dimensions in various European countries. Figs. 5 to 9 are examples of these.

(To be concluded)

## Heating the Mixer with Blast Furnace Gas

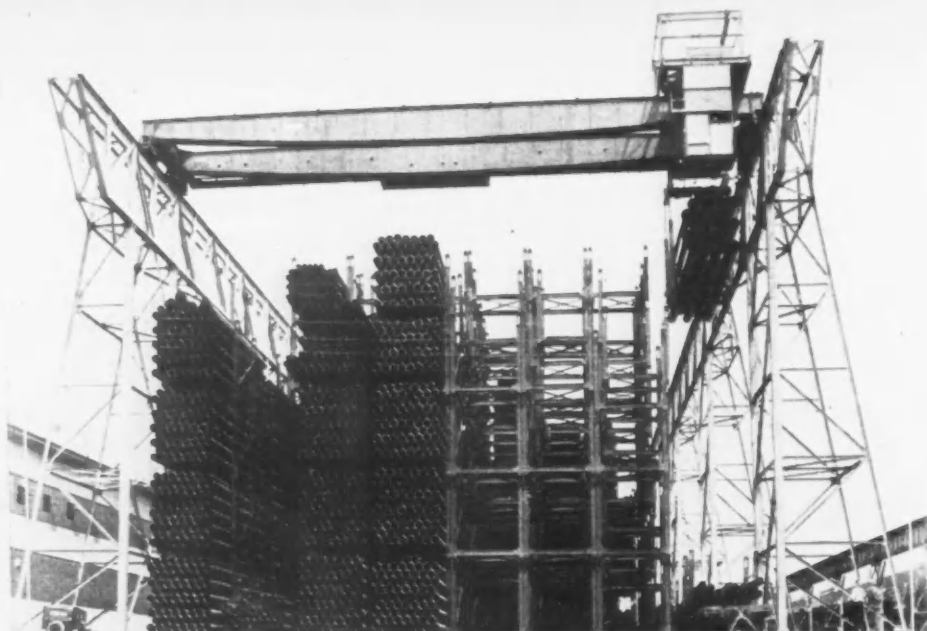
THE use of blast furnace gas for heating a hot-metal mixer is being arranged for in considerable new construction in Germany according to *Stahl und Eisen*, of May 1. In most instances the regenerative system has been employed. Two chambers are built in a single block. One of these is used to pre-heat air for the mixer flame, although only a part of the air which passes through the chamber is fed to the mixer. The remainder is used in the other chamber to burn cold gas for heating the brickwork. The cycle is similar to that used in a blast furnace stove.

As the regenerators are not built integral with the mixer, it is necessary to convey the hot air by means of a lagged and insulated pipe. The length of the pipe is such that the air temperature falls from 1100 deg. C. (2032 deg. Fahr.) to about 1000

deg. C., or 180 deg. Fahr. drop. Mixers to which the device has been applied are of the usual barrel type with three burners located in the center line of the roof. By means of flexible couplings, the burners move with the mixer when it tilts. Waste gas escapes through the spout or the slag notch.

It is claimed that temperatures as high as 1400 deg. C. (2550 deg. Fahr.) are attainable in the hearth of a 1250-ton mixer when fired by this method. Slags are very thin. Some other advantages are the possibility of securing more uniform temperature of the hot metal, and the rapidity with which the mixer can be brought to operating temperature after repairs. The regenerative system is simple and may easily be expanded by the addition of units. It may also be used with other types of furnaces for firing with blast furnace gas.

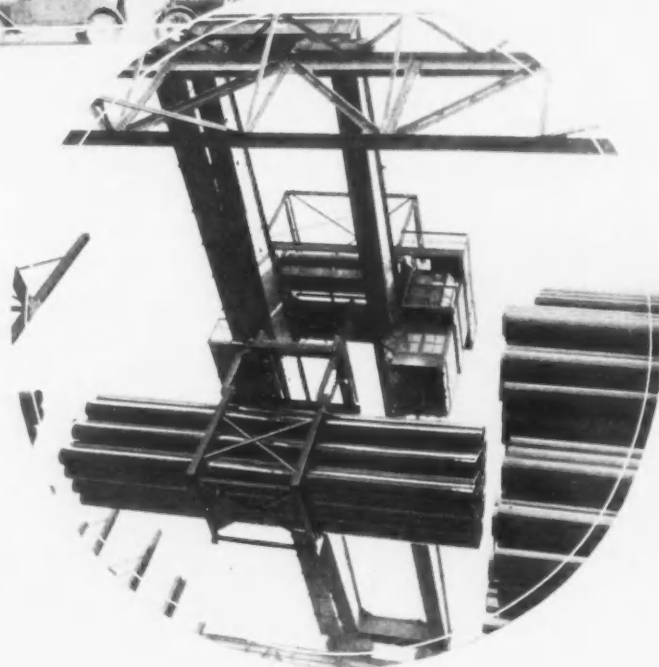
# ADAPTABLE



AN example of how good handling practice saves both storage space and handling time. Loading the cars becomes an easy job with the combination of overhead crane and special racks.

Looking up from below gives a clearer idea of the way in which the pipe is handled on racks. Note the four prong hook fixture that swings into notches on the rack posts.

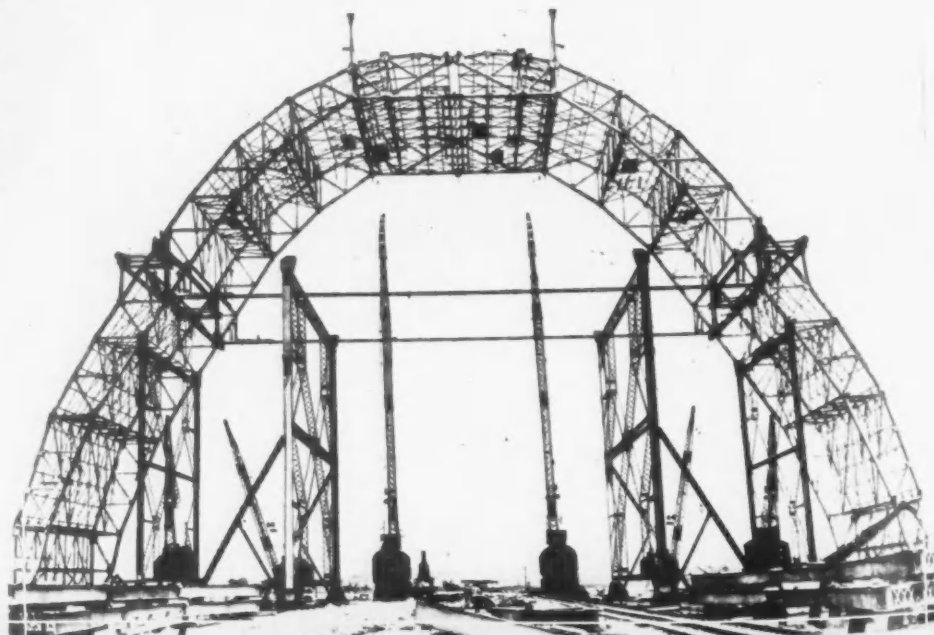
*Photos courtesy Harnischfeger Sales Corporation*



HEAVY duty crawler cranes, equipped with long "goose-necks" helped to build the Zeppelin hangar of the Goodyear Rubber Co. (above)

Six story structural erection being handled from the ground. A special extension boom on this crawler saves the need of "hitching" the usual derrick from floor to floor. (at right)

*Photos courtesy Industrial Bureau of Engineering*



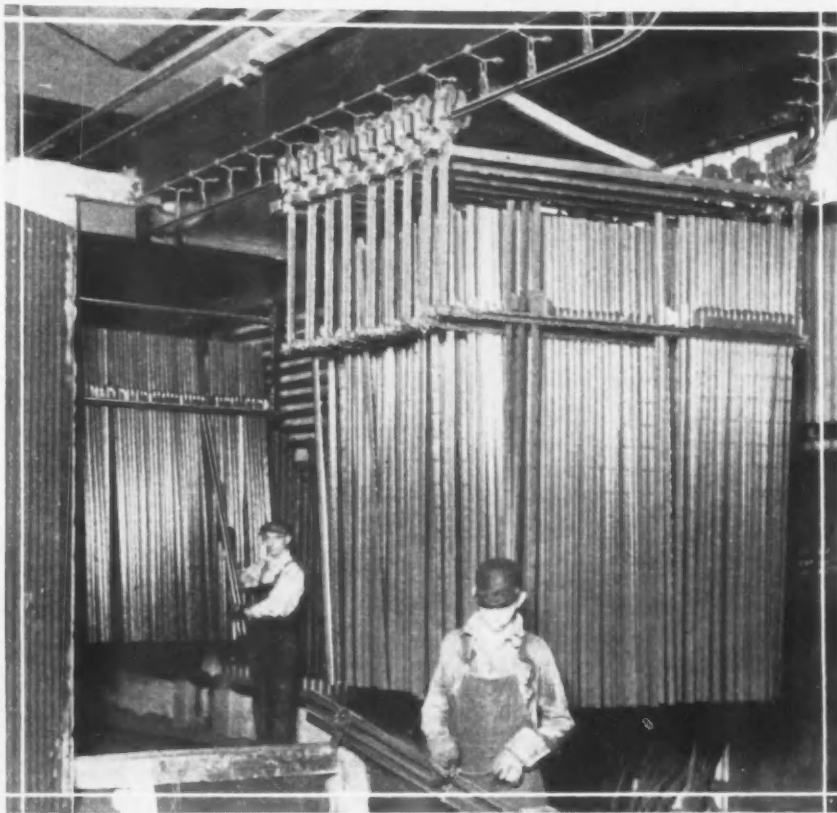
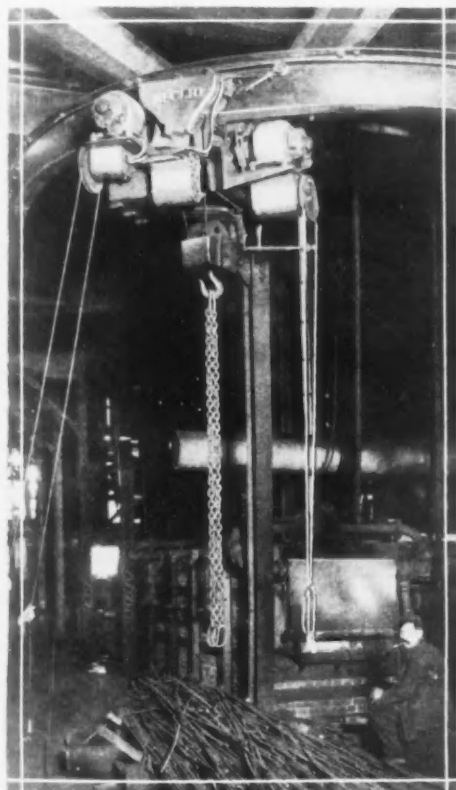


## HANDLING IDEAS



**R**EPLACING transportation provided by eight men, and saving \$8000 per year, this 5-ton hoist serves a battery of furnaces with rods. (below)

*Photo courtesy Euclid Crane & Hoist Co.*

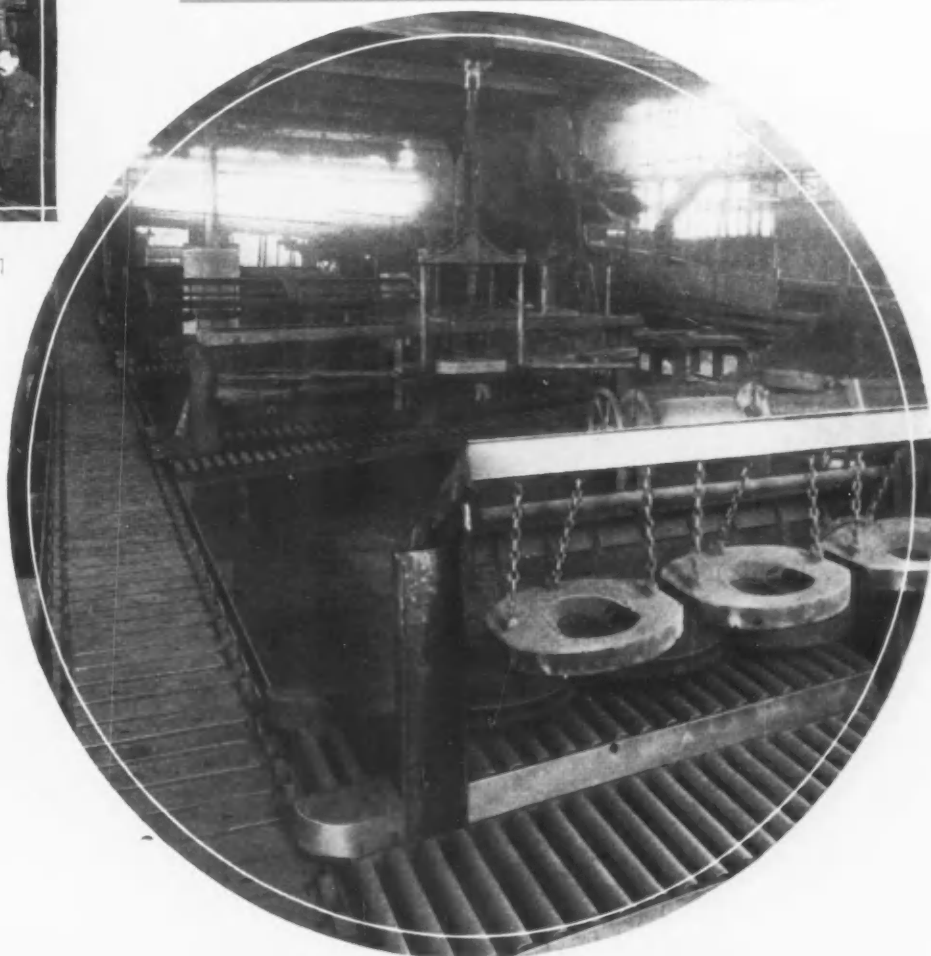


**N**OTE the converging tracks on this fence post carrier. As the load comes from the drying oven, in rectangular form, one side of the carrier advances ahead of the other, the section becoming an angular parallelogram.

*Photo courtesy of the Loudon Machinery Co.*

**M**OLDS accumulate on the cross conveyors shown here until the line is filled. Then the pouring plates shown hanging from chains are lowered, and a line of molds is ready for pouring. Meantime the opposite cross-line is being filled. The apron conveyor at the left carries the poured molds to the shake-out station.

*Photo courtesy Standard Conveyor Co.*



# Hardening With Oxyacetylene Flame

THE Shorter process for surface hardening steel, as described by its inventor, A. F. Shorter, in the July issue of the *Edgar Allen News*, Sheffield, England, is a development of recent years and provides a ready method of hardening gear wheels and other metal articles. It also is claimed to simplify production where local hardening is desirable or necessary.

The process was introduced to the engineering industry at the Shipping, Engineering and Machinery Exhibition, held at Olympia in September, 1927, as a practical and commercial proposition after some years experimental work and experience in the surface hardening of metals. Claims for the process are summarized herewith:

## Claims Made for the Shorter Hardening Process

- Surface hardening with negligible distortion.
- Greater depth of actual hardening than obtained generally by the carburizing process.
- Precision control of operation giving uniformity of the treatment throughout.
- Core of material unaffected by the hardening of the surface.
- Applicable to a large range of medium and high-carbon steels, also to certain alloy steels.
- Applicable to heavy work that could not be hardened by other means.
- Gears can be put into service immediately after hardening.
- Time saving in hardening operation over other methods is considerable.
- The hardening can be applied to given areas without affecting other parts of the articles.
- "Shorterizing" requires no special skill, so that men of average intelligence can be trained quickly to carry out the operation.

Hardening is effected by mechanically passing an oxyacetylene flame, suitable in size and degree, over

the surface to be hardened and following this with a cooling jet to quench the heat imparted to the surface. This cooling jet follows immediately behind the heating flame as it traverses the surface of the metal so that quenching takes place immediately the steel is brought to the critical temperature.

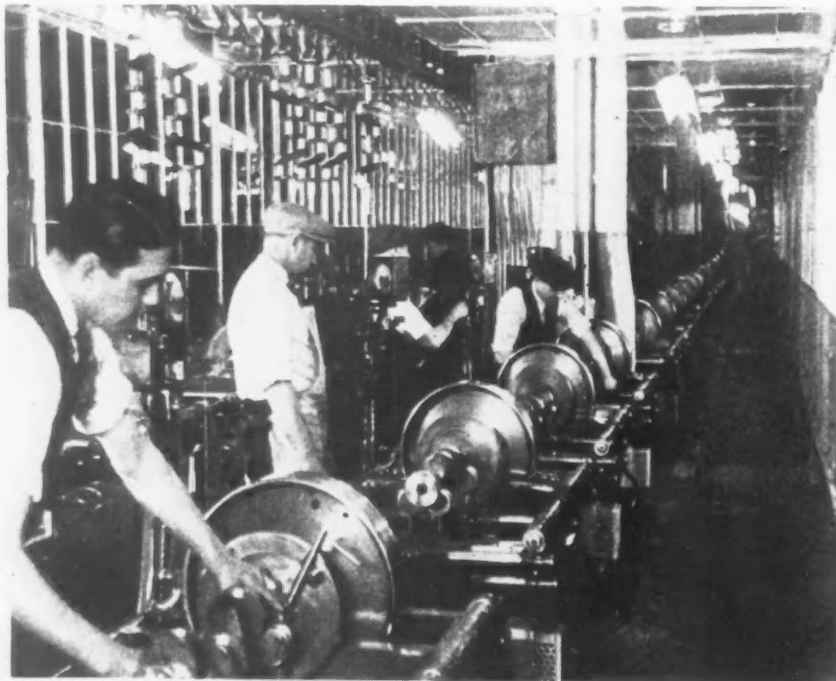
For plain carbon steels, water provides a satisfactory quench; the volume and rate of application are varied to suit the mass to be quenched. There are certain steels, however, which cannot be water quenched without producing surface cracks. Many of the alloy steels require to be quenched in air or oil, but as it is hardly feasible to employ oil behind an oxyacetylene flame, provision has been made to impinge a jet of nitrogen or air instead of water in such cases.

## Some Results on Two Steels

The following table shows the results produced on a plain carbon and a nickel-chrome steel:

Steel: 0.55 Per Cent Carbon; 0.76 Per Cent Manganese:	
	Brinell
Surface hardness.....	645
0.025 in. below surface.....	639
0.050 in. below surface.....	630
0.120 in. below surface.....	592
Normal hardness.....	186
Steel: Nickel-Chrome Steel:	
Surface.....	580
0.025 in. below surface.....	565
0.050 in. below surface.....	560
0.100 in. below surface.....	368
0.150 in. below surface.....	230
Normal hardness.....	221

In each case the surface hardness was taken and also hardness determinations after grinding to various depths below the surface. The 0.55 per cent carbon steel test was taken on a 3 diametral pitch and the nickel-chrome on a 4 diametral pitch gear tooth. It is also interesting to note that in the former a Brinell hardness of 592 was obtained at  $\frac{1}{8}$  in. below the surface.



THE balance of the crankshaft and the flywheel is checked at the River Rouge plant of the Ford Motor Co. in closed rooms the temperatures of which are maintained at 68 deg. Fahr. These rooms were recently completed in the motors building.



## Miniature Golf—A New Outlet for Steel

By L. W. MOFFETT

**T**HE popularity of miniature golf is evident to everyone, but few appreciate that this game has created new uses for steel. And, judging from the rapid spread of Tom Thumb courses throughout the land, the amount of steel that they are consuming is growing to sizable proportions. What these links may be as a permanent outlet for steel, especially small pipe and sheet steel, remains to be seen, and is dependent upon whether or not this form of diversion does or does not prove to be only a fad of short duration.

James B. Lockwood, of the Textile Division, Department of Commerce, has just published the results of a survey dealing with the possibility of increased use of cotton products by the "wee links." The figures he cited were rather startling. It was estimated that the value of the little courses was \$125,000,000. This total excludes real estate involved, which was said to be showing a return upon a valuation of hundreds of millions of dollars in addition. The survey estimated the number of courses at 25,000, which was considered to be conservative more than a month ago. What the total is now, or will be a month from now, is at best con-

jecture. Some estimates are that there are now 40,000 or 50,000 courses in the United States.

The majority of the courses now operating have yet to span the lean seasons of late fall, winter and early spring—the bogeys of wet, cold and snow, with their accompanying discouragements to regular exercise. The greater part of the past season has been dry, with few interruptions to play except from unusual heat during the day. The problem of how to extend the seven-month season in the East and North, Mr. Lockwood pointed out, arises in this case as inevitably as it has in the building trades. It raises the question whether outdoor golf becomes indoor golf, taking unto itself new, expensive quarters, possibly occupying spaces now used for theaters, gymnasiums, winter show places, etc.

**P**PIPE used for electric light standards in existing courses represents an investment of more than \$1,500,000.

Forged steel putters in use on Tom Thumb links number more than 1,500,000.

Pipe is employed to edge the fairways. Large quantities of pipe will be required for framing if canvas coverings for outdoor courses come into vogue.

Courses are frequently inclosed with steel fence.

The survey found the miniature golf course to be peculiarly adapted to benefit by installing canvas coverings in one form or another. Tents of the larger type, listed as new, second hand or for rent, it was stated, can be bought at prices ranging from \$500 for "tops" to \$7,500 for capacity installations of the best grade. An awning installation of the shed-roof type, according to the survey, can be



installed at about 20c. per square foot, or about \$1,900 for a space 75 x 125 ft. Due to variations in size, such installations would not ordinarily be standard, so that at the present time costs might be higher than they would have been if standard tent and awning sizes were taken into account at the time that the course was built. Manifestly, the report did not mention the possibility of sheet steel roofs; yet it would seem to be not only a possibility but a probability as well.

It has been estimated that the supporting framework costs as much as the canvas. Included in such installation, it has been suggested, might be a galvanized framework to support the canvas top and sides, a heavy center if a ridge is desired, a mechanism for unrolling the canvas, ties to fasten it at the supports, and various other features. Galvanized steel pipe for this framework would range from  $\frac{3}{4}$ -in. to as high as  $1\frac{1}{2}$ -in.

All of the arc lights now used on the courses are supported by steel pipe. The bottom standards generally are 2-in. galvanized pipe, said to sell at about 26c. per foot, wholesale. There are at least 10 standards, generally 20-ft. high, so that there would be 200-ft. of pipe for each such course for electric illumination. Assuming only 25,000 courses with such equipment, the investment for pipe would be approximately \$1,500,000, or about \$52 for each course. Some, however, represent an investment as high as \$100 for pipe

standards. Many courses have a patented pipe along the edges of the fairway so constructed that when the ball is struck it is deflected so as to remain on fairways instead of jumping over them. Galvanized or plain sheet steel made into pipe, such as used in guttering, also is installed underground leading from the fairways to the putting greens. Then, too, the cheap putters have forged steel heads. There are about 60 putters to a course so that, again on the basis of only 25,000 courses with 60 putters each, this would mean 1,500,000 such putters. In this connection it is refreshing to observe that the manufacturers of cheap putters have escaped the depression and have been kept busy supplying requirements.

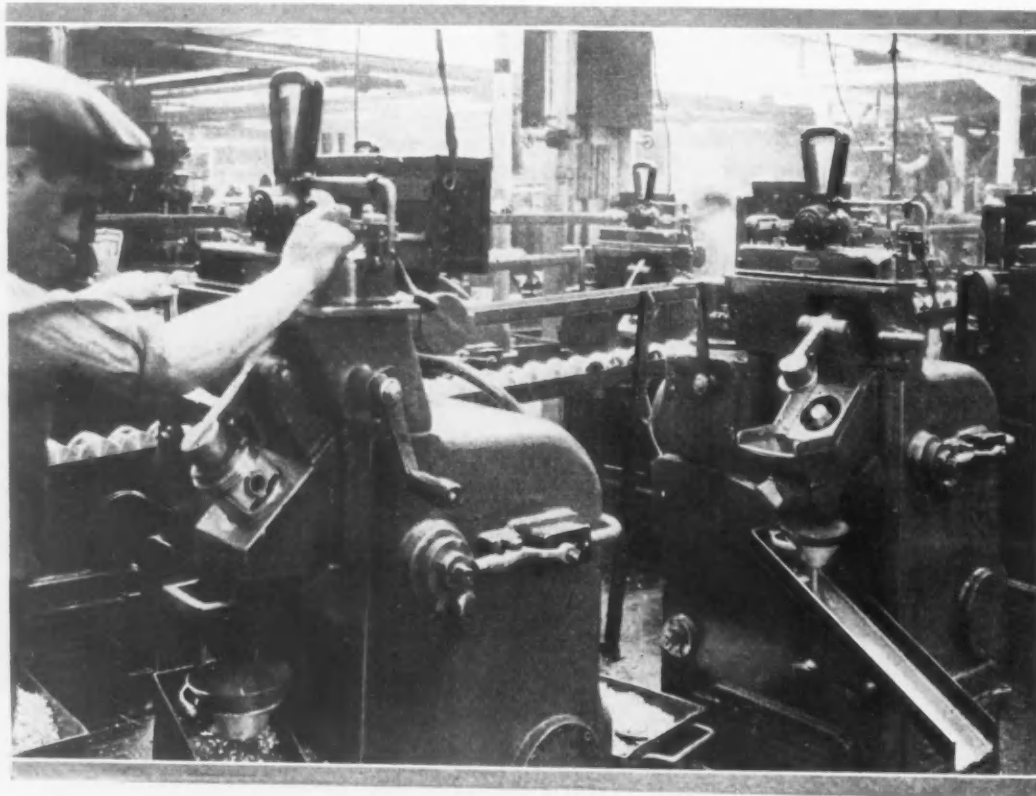
Steel or cast iron in the form of heating apparatus may also profit from the pony golf industry. It has been pointed out that a covered course would swell receipts for apparent reasons, the present day-time receipts of the uncovered course usually averaging only 25 per cent of the day's total. The past season was found to have been profitable to the golf courses in one item that will not soon be repeated. Rainfall has been lower than the average for the previous fifty-five years. A course covered against snow for winter play, it has been pointed out, does not necessarily have to be heated, although the comfort of a completely enclosed game will probably repay the investment involved, as is suggested by the increasing vogue of indoor courses.

### *Machine Determines Amount of Metal to Be Removed and Then Removes It*

**T**HE last operation on pistons for the model A Ford car is performed on weight equalizing machines designed and built by the Ford Motor Co. at its River Rouge plant, Dearborn, Mich. Ten machines, each of which has an operator, have been

installed in the motors building. To them are brought the pistons which have been finished, except that they are slightly overweight. The operator determines the amount of overweight on a delicate scale and then sets the machine scale to a reading corresponding to the

overweight. The scale contacts with a chip cup. After the piston is placed in the machine, metal chips are bored from its inside diameter and drop into the cup. When the weight equals the amount of overweight, the boring stops automatically and the piston is removed. The entire operation takes about 20 seconds and the weight is accurate within two grams.



## Double-Crankshaft Press Facilitates Off-Center Work

**P**ROBLEMS of stress distribution in blanking, piercing and drawing press operations have become of increasing importance with the introduction of larger steel sheets for automobile body stampings, the one-piece construction of fenders, the use of larger presses for multiple stamping and drawing of smaller parts simultaneously, and the desirability of using a single press for more than one operation on a certain part.

Study of this situation has led the Marquette Tool & Mfg. Co., Chicago, to introduce a new line of four-crank double-crankshaft presses which are designed for four-point suspension and four-point press application to the die-holding slide. The two crankshafts are synchronously driven in opposed directions through herringbone gears which in turn are operated from a motor-driven main shaft. Each crankshaft drives two cranks, the four connecting rods being attached to individual slide blocks, thereby incorporating a synchronized adjusting mechanism. The slide blocks in turn connect to the slide at each of four points, spaced so as to reduce the maximum area of die surface over which the stress from each crank must be distributed.

The herringbone gears, which run in oil, were selected for quietness, decreased vibration and longer life. A special feature of the new press is the method of vertical slide adjustment which eliminates spacer or bolster plates for die location. Connecting rods are attached to a block locked in the guide by means of a pin through

the block which, in turn, is provided with the adjustment screw, bearing against the buttress plate. This adjustment mechanism, including the worm gearing, is inclosed, the arrangement being such that all bending moments on the adjusting mechanism are eliminated.

Another feature of the machine is the use of two air cylinders to counterbalance the weight of slides and dies. These cylinders are connected to the main air supply through a reducing valve whereby the air pressure

may be adjusted according to the weight to be counterbalanced. They are of closed system type, there being no exhaust of air to the atmosphere.

The clutch and brake are separated, the clutch housing being mounted on the flywheel hub, thereby reducing inertia forces in starting and stopping. The brake is mounted on the flywheel side of the shaft and is interconnected with the clutch for simplicity of operation. Mounted on the main shaft is a semi-automatic cam which permits adjustment of the press to enable stopping in any position. Brake and clutch connections are of the tie-rod type for positive action.

## Revises Abrasive Wheel Standard

A revised edition of the American standard for the use, care, and protection of abrasive wheels has been approved by the standards council of the American Standards Association.

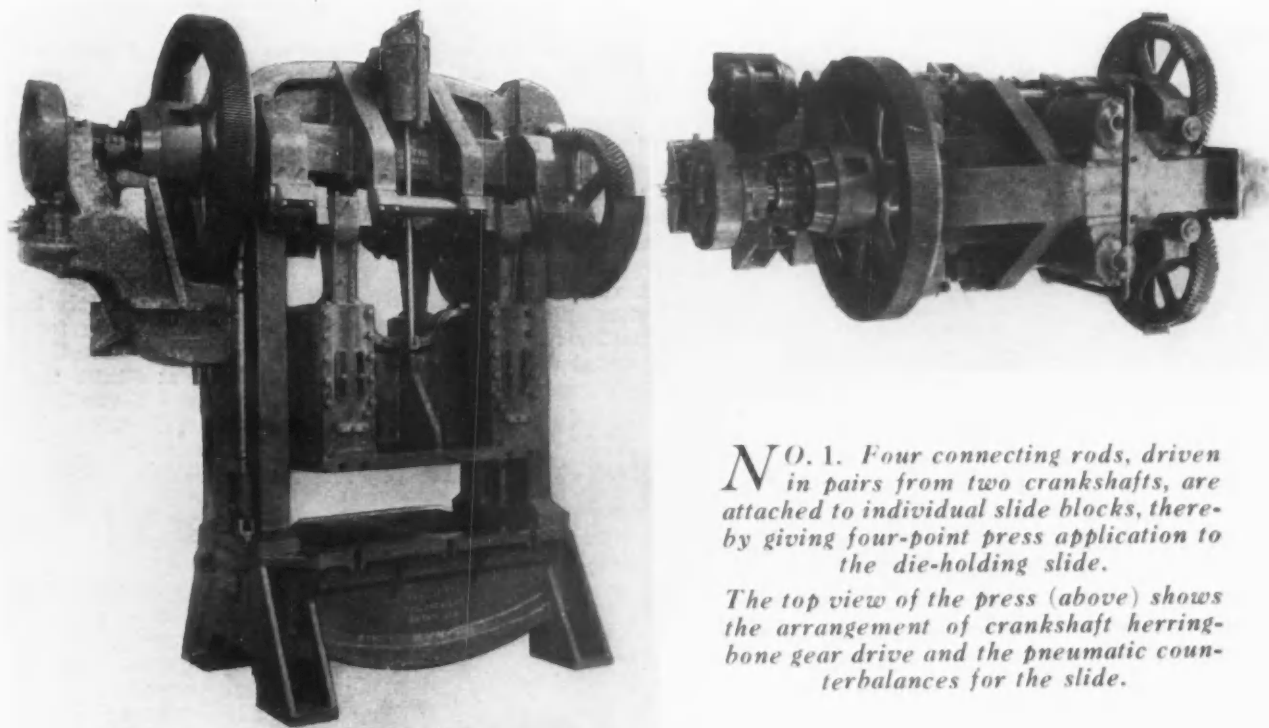
The original edition of the code, approved in 1926, was widely adopted; progress in the grinding wheel industry during the past four years, however, has made revision necessary.

In 1926, the maximum peripheral speed for the majority of grinding wheels was 6000 to 6500 ft. per min. The present code provides for maximum speeds ranging from 4500 to 16,000 ft. per min., these higher speeds having been made possible by the use of synthetic resin and rubber bonded wheels. The new code also

provides for the use of steel castings for hoods for high-speed wheels, the suitability of such material for this purpose having been determined by actual destruction tests.

It is recognized that "the importance of proper wheels, correct mounting, suitable machines, careful operation and proper speed are a means of preventing wheel breakage. But as all of these things are dependent on human control, it is considered essential that some form of mechanical guard be employed at all times."

The code includes requirements for types of protection devices, storage and inspection of wheels, general machine requirements, protection hoods,



**N**O. 1. Four connecting rods, driven in pairs from two crankshafts, are attached to individual slide blocks, thereby giving four-point press application to the die-holding slide.

The top view of the press (above) shows the arrangement of crankshaft herringbone gear drive and the pneumatic counterbalances for the slide.

work rests, protection for cup, cylinder, and sectional ring wheels, flanges, mounting, speed, operating

rules and general data. It applies to wheels 3 in. and larger, operating at speeds exceeding 2000 ft. per min.

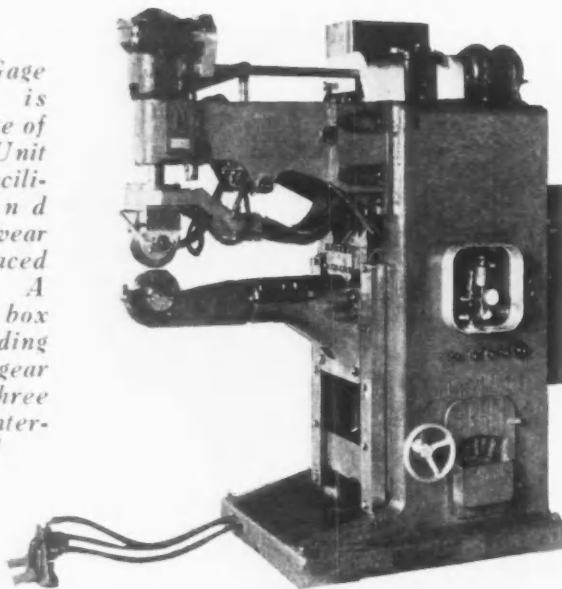
### To Exhibit Improved Seam Welder

**A** SEAM welder incorporating several improvements will be demonstrated by the Thomson-Gibb Electric Welding Co., Bay City, Mich., at the National Metal Exposition to be held in Chicago, Sept. 22-26. This machine is designated as the No. 4HDA, and has capacity for welding two pieces of No. 14-gage material at the rate of 6 ft. per min.; material of

spur gears, a Micarta pinion being used on the motor. From the four-speed gear box the drive is to the worm-gear speed reducer through spur gears, one of which is non-metallic. The worm reduction unit drives, in turn, the upper welding wheel through a ball-bearing vertical shaft and a set of bevel gears.

The three-speed interrupter change-

*No. 14 Gage material is welded at the rate of 6 ft. per min. Unit construction facilitates repair and parts subject to wear may be replaced conveniently. A change gear box gives four welding speeds; another gear box provides three changes of interrupter speed*



lighter gage is welded at higher speeds.

Although the welding roll is necessarily a slowly revolving member, the gears and shaft that drive it are designed to rotate at moderately high speed. The worm-gear reduction unit is placed as close as possible to the welding roll. Parts subject to wear have been designed so that replacements may be made with a minimum loss of welding time. The driving mechanism is made up of independent units suitably housed, both for lubrication purposes and for convenient removal to a work bench for repairs, if necessary. All parts of the machine subject to the heat of welding are adequately cooled by independent water-cooling circuits.

The base and top of the machine are now cast in one piece to provide maximum strength and a rugged foundation for the several units mounted on it. The driving mechanism consists of motor, gear box giving four changes of welding speed, worm-gear reduction unit, driving head unit, gear box giving three changes of interrupter speed, and a patented current interrupter. From the motor the drive to the four-speed gear box is through

gear box is driven from the worm-gear reduction shaft by means of roller chain; it drives the interrupter through two spur gears, one of which is non-metallic. This drive is arranged so that the welding speed can be changed if desired without altering the number of current interruptions per inch of weld. The chain and gears connecting the worm-gear reduction to the four-speed gear box are covered by a cast aluminum guard. Both gear boxes, as well as the worm-gear reduction unit, run in a bath of oil, and the Timken roller bearings used are mounted to assure long life under heavy-duty conditions.

An extra upper welding roll and shaft assembly are furnished so that welding time lost will be only that incident to changing from the worm to the retrimmed assembly. A special lathe adapter is supplied to facilitate redressing the welding roll.

Either a straight or a circular seam lower arm may be used in the lower arm holder. The upper welding head swivels, permitting the machine to weld either straight or circular seams.

The vertical stroke of the upper welding roll assembly is actuated by

a double-acting air cylinder mounted in the upper arm casting. An adjustable compression spring is attached to the operating lever between the air cylinder and the upper welding head spindle; it is mounted on a ball thrust bearing to facilitate adjustment. The remote control switch actuating the main welding current contactor is attached to the compression spring lever and is arranged so that it will not operate until the pressure on the work is sufficient to prevent arcing as the rolls touch the metals to be welded. This switch is fully automatic and needs no adjustment or other attention.

The foot-operated valve that controls the air can be moved to any position convenient for the operator. Automatic air line lubricator and air pressure regulating valve and gage are standard equipment.

### Metal-Cutting Torch Using Gasoline

**A** GASOLINE-BURNING, metal-cutting torch has been developed by the Torchweld Equipment Co., Chicago. This has passed the laboratory tests and has been put into industrial use. This equipment is said to simplify the fuel question for work of this general character, through the great ease of obtaining gasoline.

Service tests have shown a low fuel consumption and the torch is claimed to effect heavy savings, compared with other methods of cutting. It is said to be particularly rapid in operation and to give consistently clean work. The cuts are reported free from rough, jagged edges or underhung slag and the torch will work well on old or rusty metal.

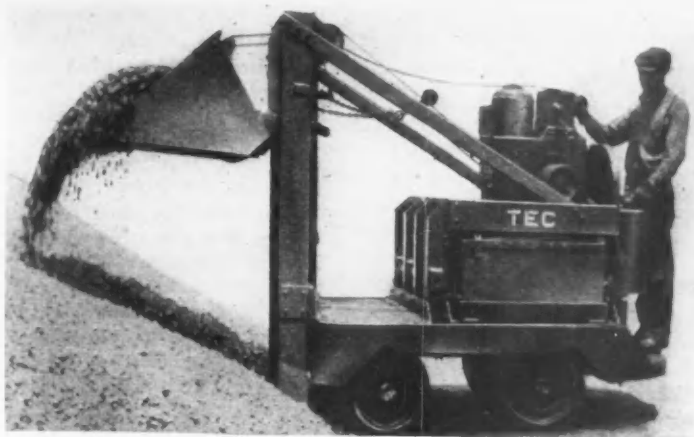
For large work the torch can be employed in a cutting machine. It can be used for cutting bolt and rivet heads, slits and openings of all sizes and shapes, and for the wide variety of work usually associated with gas or acetylene cutting in general.

### Further Shrinkage in Factory Pay

Average weekly earnings in July in representative New York State factories are reported by the State Industrial Commissioner at \$28.50, the lowest such figure since September, 1925. This compares with \$28.96 in June and with \$29.80 in July, 1929. It covers all employees in both office and shop.

A miniature working model of a boiler room was exhibited at the Power and Industrial Exposition, Cleveland, Sept. 8 to 12, by the Mason Regulator Co., Boston. A special line of pressure-control devices for power and industrial process work was shown, also.





### Shovel Truck for Handling Bulk Materials

THE Terminal Engineering Co., 17 Battery Place, New York, has brought out an electric four-wheel drive shovel truck, which, although small enough to work inside a box car, has capacity for digging and carrying 1 ton loads. It is stated that the shovel is capable of unloading a box car every hour, carrying its loads either indoors or outdoors.

Ruggedness is an important feature, the machines being designed to run into piles of crushed stone, scrap metal, etc., lift out a bucketful and then carry the load over rough ground to the dumping place. Four-wheel drive, with separate motor for each wheel, gives the machines the necessary traction for pushing their shovels into a pile, and for work in slippery places, on cinder-fill yards, sand or snow. The traveling speed is 10 miles per hour empty and 8 m.p.h. loaded. The loads are carried in an overhung position and maximum counterbalance is obtained by locating the battery, hoist, etc., at the opposite end of the frame, as far away from the load as possible. The truck can be used as a tractor when desired.

In designing this new shovel truck the manufacturers have used standardized parts. The chassis is the same as that of the company's model BC-36-in. heavy-duty crane, and all main units such as wheels, battery, motors, steering, braking, hoisting, etc., are interchangeable with those of other models of TEC equipment. If desired, the elevating structure may be replaced quickly with a crane boom.

The shovel buckets are made in various widths for handling different materials. A single hoist unit controls all functions of the bucket. An automatic stop on the upstroke speeds up the operations on short-haul work and acts as a safeguard. The up-rights on which the shovel carriage runs are built in various heights, the up-rights of the machine illustrated being of a height that will work in box cars. The turning radius is unusually short because all four wheels steer; it is stated that the truck turns about a point only 2 in. from the side of the truck, midway between the axles, and is able to make this short turn be-

cause each wheel is separately driven.

The shovel is operated from a storage battery which is in a steel compartment located over the wheels at the driver's end, to act as a counterbalance. Batteries may be interchanged quickly for continuous operation. Safety features include two sets of brakes, mechanical on two wheels and electrical on four wheels, operating independently from the foot pedal and speed controller respectively. The operator's hands are protected from injury because all controls are within the outer edges of the truck at all times, the steering being done by a wheel rather than by handle-bar. The weight of this shovel truck, which is designated as the model B, is 7500 lb., including battery.

### Redesigned 60-In. Engine Lathe with Triple Face-Plate Drive

TO the completely redesigned line of heavy-duty engine lathes built by Wickes Brothers, Saginaw, Mich., and announced in THE IRON AGE of Feb. 7, 1929, has been added a 60-in. geared-head lathe with a triple-gear face-plate drive.

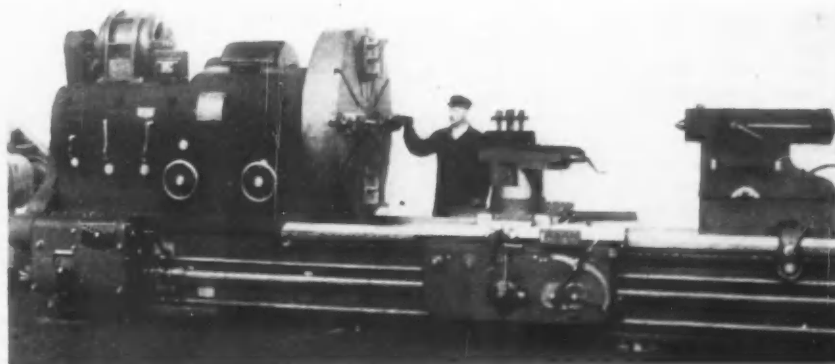
As in the smaller machines, unusually large members and use of ball and roller bearings throughout, except for the spindle, are features. Sliding gears in the headstock are mounted on splined shafts. Where load conditions make it desirable,

hardened alloy steel gears are used, and where necessary the gear teeth are machine-rounded to assure easy sliding engagement. Levers on the headstock provide for the selection of any of 16 spindle speeds. Direct spindle drive speeds range from 8 to 200 r.p.m., and face-plate drive speeds from 2 to 50 r.p.m. The handwheel at the extreme right of the headstock is for engaging and disengaging the face-plate drive, while the lever at the extreme left is for reversing the lead-screw. Mounting the face-plate pinion on a heavy shaft with roller bearings on each side of the pinion is emphasized as preventing deflection of the pinion under heaviest load, and as eliminating the usual overhanging pinion arrangement.

The main spindle, a high-carbon steel forging with journals ground and burnished, has a 2 $\frac{3}{4}$ -in. hole, drilled from the solid. It is mounted in bronze boxes, the front bearing being 12 x 15 in. and the rear bearing 6 $\frac{1}{2}$  x 10 in. Thrust is taken on a ball thrust bearing.

Splash and pressure lubrication of the headstock, with a sight-glass gage for noting the functioning of the system, is provided as in the smaller lathes. A 40-hp. 1200-r.p.m. driving motor is employed, and apron control may be either electrical or mechanical. The main drive clutch is the same as used on all Wickes lathes; the clutch and brake is sensitive and the spindle may be jogged if desired. Construction of the compound rest and carriage follows the smaller redesigned machines. Motor-driven longitudinal rapid traverse for the carriage, as well as rapid cross traverse, can be provided. The apron, of double-plate design, is bolted and doweled to the carriage. The levers that engage and disengage the bevel pinion for power feed of the carriage and the nut on the lead-screw are interlocking; neither lever can be moved until its companion is in its neutral position.

The taper attachment is of the improved design, featuring simplicity, used on the other lathes, and the tailstock is of adjustable overhanging design. The quick-change gear box unit, which has been carefully designed, is tongued, grooved and bolted to the lathe bed. All gears are of steel with teeth cut from the solid and machine-rounded to facilitate engage-



ment. Forty feed changes are available. Longitudinal feeds range from 0.025 to 0.700 in. and cross feeds from 0.009 to 0.252 in. per revolution of the spindle. Threads per inch range from 14 to  $\frac{1}{2}$ . Specifications include:

Swing, 62 in. over bed, and 50 in. over slide on carriage and compound rest; distance between centers with standard 20-ft. bed, 8 ft.; distance between centers, tail-stock overhung, 9 ft. 1 in.; face-plate diameter, 60 in.; maximum size tool shank,  $2\frac{1}{2}$  in.; net weight, with 20 ft. bed, 48,000 lb.; and floor space, 7 ft. 1 in. x 22 ft.

## High-Speed Hydraulically-Driven Surface Grinder

FOR the accurate finishing of dies, punches, thrust collars, spacers, flat and formed cutters and other pieces at high speed, the Diamond Machine Co., Providence, R. I., is offering a new hydraulic surface grinder designated as the type G.

The machine will grind work  $7\frac{1}{2}$  in. wide, 22 in. long and 9 in. high under

dle is mounted in ball bearings protected by dust flanges, and the thrust adjustment is taken on the driving end of the spindle. The spindle is driven by a  $1\frac{1}{2}$ -hp. 1800-r.p.m. motor through V-belt and sheaves, the motor being mounted on an adjustable base so that proper driving tension may be maintained on the V-belt.



**T**ABLE speeds up to 50 ft. per min. are obtainable through the hydraulic drive mechanism. Pieces  $7\frac{1}{2}$  in. wide, 22 in. long and 9 in. high, or smaller, may be ground under a 10-in. wheel

a 10-in. diameter wheel. The bed is a single casting with vertical ways carrying the wheel-head and horizontal ways guiding the saddle. The gib holding the wheel-head against the bed is bolted, and adjusting screws permit adjustment of the gib to prevent side play. The oil reservoir, oil pump and control mechanism, coolant reservoir, sediment tank and coolant pump are located within the bed casting. The wheel-head is cast integrally with the spindle housing.

Two means are provided for moving the wheel-head, the coarse feed elevating handwheel on the front of the bed, with which the wheel may be rapidly raised or lowered; and the elevating micrometer feed handwheel located to the left and slightly above the abrasive wheel, used for accurate vertical down feed. The face of the elevating micrometer feed wheel is graduated in 0.0001 in.

Overhang of the spindle housing, or the distance from the abrasive wheel to the wheel-head ways, is much less than the length of the vertical ways. The hardened and ground spin-

The entire driving mechanism is covered by a cast-iron guard. Two-step sheaves can be furnished as extra equipment so the spindle speed can be increased for small wheels.

The spindle is designed for a wheel 10 in. in diameter,  $\frac{3}{4}$ -in. face and 1-in. hole. The cast-iron wheel guard has a hinged cover which can be swung out of the way when changing wheels.

The saddle is mounted on the bed V-ways and carries the table and the hydraulic cylinder that operates the table. Power cross feed at each end of the table travel is operated by a hydraulic piston. Before any oil can enter the table cylinder it must pass through the transverse travel cylinder, driving the piston which causes movement of the saddle. Since the oil must operate the feed before it gets to the table cylinder, the feed is completed at the moment of table reversal, thus eliminating shock. The amount of cross feed may be easily regulated by the adjustable cross feed crank. The saddle is limited in its travel by a limit switch above the sediment tank

door; throwing this switch stops the table drive motor. The cross feed mechanism is operated manually by pulling the handwheel forward after the power cross feed has been disengaged by turning a knob on the handwheel hub. Maximum cross feed, power or hand, is  $8\frac{1}{2}$  in.

The table platen is 22 in. long and  $7\frac{1}{2}$  in. wide and is provided with three T-slots. The platen is carefully ground to assure accurate work, and has a drain from which the coolant flows to the sediment tank and reservoir. Hydraulic and coolant pump sub-assemblies are mounted on a plate bolted to the left-hand side of the machine.

With the hydraulic drive, high table speeds, 50 ft. per min. and more, are instantly obtainable through the table speed control valve. The table may be hand operated by means of the hand crank shown, this crank being removable. The table ways are oiled automatically by the hydraulic system.

An 8-in. x 22-in. x  $3\frac{3}{4}$ -in. magnetic chuck can be supplied as extra equipment. The maximum cross feed of  $8\frac{1}{2}$  in. is ample for this size.

Spindle speeds are 2000 r.p.m. with single sheave, and 2000-2500 r.p.m. with double sheaves. Feeds are: Cross, automatic, up to 0.125 in. per stroke; handwheel, 0.400 in. per revolution; vertical coarse feed handwheel, one revolution, 0.125 in. Floor space occupied is  $43\frac{1}{8}$  x  $88\frac{3}{4}$  in.

## Manganese Steel Plate on Power Shovels

OPERATORS of power shovels will be interested in the accompanying illustration, which shows a dipper door made of manganese steel plate.

This particular dipper door is for one of a number of 4-yd. shovels used by the Dolese & Shepard Co. in limestone quarrying operations.



The pieces handled are fairly heavy and large, causing a great deal of breakage and wear on dipper doors. This necessitated frequent replacements and shutdowns and repair expense.

The dipper doors are now equipped with Rol-Man manganese steel plate manufactured by the Manganese Steel Forge Co., Philadelphia. The main part of each dipper door is made of two pieces of manganese steel plate 53 in. sq. and  $\frac{1}{2}$  in. in thickness. These pieces are joined together by countersunk rivets and then riveted to the hinge arms. The end portion of each door is reinforced with a  $\frac{3}{4}$ -in. liner made of two pieces of  $\frac{3}{8}$ -in. manganese steel plate.

# Drop in Unfilled Orders an Unfavorable Sign

BY LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

**S**TEEL production in August increased more than usual for the season. Our adjusted index now stands at 80.2 per cent of normal, against 77.1 per cent in July. Except for July, it is the lowest on this recession.

This increase accompanies a decrease in unfilled orders of the Steel Corporation, continued price irregularity for iron and steel, and a reduction in pig iron production. This is the only case on record (back through 1921) in which steel production has increased without a concurrent gain either in unfilled orders or in prices. Almost always, too, pig iron production has increased with steel, and there is no case in which there has been such a pronounced divergence as now.

Steel production turned upward in August in 1921, in 1924 and in 1925, in the first two cases indicating the beginning of an upward movement after a business recession. We cannot say with certainty that July was not the bottom of the current recession. Surrounding circumstances continue so unfavorable that this does not seem probable. It seems more reasonable to suppose that the increase last month was under the influence of seasonal conditions.

Unfilled orders of the Steel Corporation decreased in August with unusual sharpness, in a month which normally shows an increase. The movement indicates that the new business booked by the leading steel manufacturer did not keep pace with the expansion in production.

## Comparison with Nine Years Ago

The August average price of finished steel was 2.153c., against 2.175c. for July, and was the lowest since the middle of 1922. At present the average is 2.142c.

The question arises, is the present situation in business like that in 1921?

In August, 1921, the trend of building activity was distinctly upward. Automobile production was expanding. Manufacturing output in general was on the upgrade. Commodity prices, according to the Bradstreet index, had been advancing steadily for some months. Stocks of basic commodities were low and stocks of merchant pig iron decreased sharply. The foreign trade situation was relatively favorable, and large gold imports were coming in. Not one of these statements can be made at the present time; in each case, the opposite is now true.

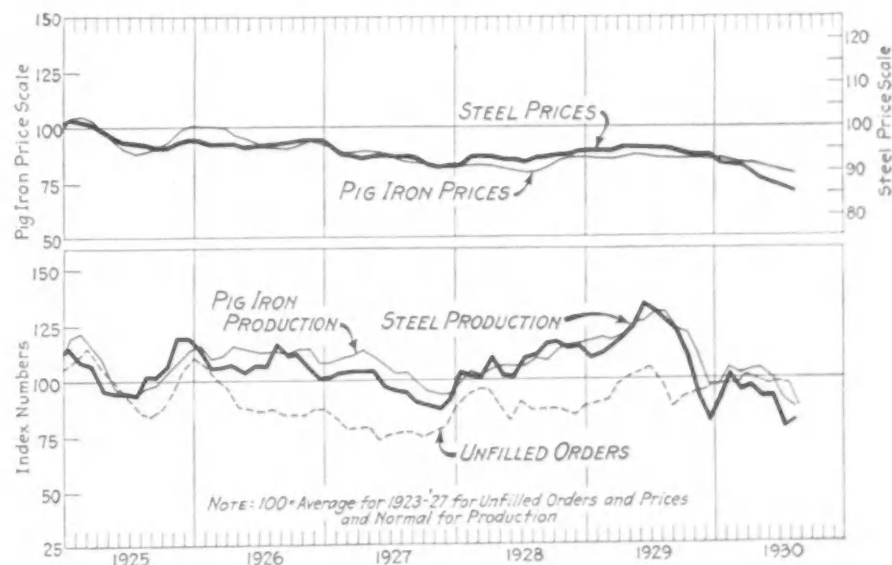
The August decrease of 4.3 per cent in pig iron production occurred in spite of the fact that there is usually an increase in that month. Our adjusted index becomes 87 per cent of normal, which compares with 90.3 in July, and 130.4 a year ago.

Finished steel prices are not yet in position to make any sustained advance. Though absolutely low, they are high in comparison with the general level of commodity prices. Demand from the chief consuming industries is extremely backward. The trend of unfilled orders is downward. Conditions in foreign markets suggest no relief through exports.

Though curtailment of production is hastening the readjustment of supply to demand, and in some markets, at least, the price is the lowest since 1915, the pig iron market seems likely to show some further recession.

Recent advances in the scrap market are obviously not due to any more-than-seasonal increase in the activity of demand. The chief factor seems to be found in the restricted supply of desired materials due (a) to past heavy exports and (b) to present curtailment in the industries which produce scrap.

Steel production went up in contrast with other movements. Pig iron output dropped, in place of the usual August rise. Price reductions may be expected in pig iron and semi-finished steel





W. W. MACON  
Editor

# THE IRON AGE

A. I. FINDLEY  
Editor Emeritus

(ESTABLISHED 1855)

## Making the Most of Metal Week

WITH a full year of business recession behind them, the men who go to the National Metal Congress and Exposition at Chicago next week stand to get more for their time and money than from any other of the Steel Treathers' meetings, notable as they all have been. Both manufacturing consumers of steel and those from whom they buy their raw material and equipment for treating it have a twelve months' background quite unlike that of the 1929 exposition and its immediate predecessor. In contrast with the slowing up of production, the past year has been distinctly one of activity in research throughout the metal-working industry. For example, the joint work of the Carnegie Institute of Technology and the United States Bureau of Mines has been pushed with particularly good results, under the cooperation of 43 steel companies. Also a good start has been made by the Iron Alloys Committee of the Engineering Foundation, which has a \$150,000 budget for the initial stages of its investigations.

Individual corporations, notably some represented on the Chicago program, have made more than an average year's headway in their laboratories. Whatever adjustments they have been compelled to make in operating or sales departments, they have found that this, of all times, is one in which effort for the betterment of their steel and for its more economical and effective use must be kept at high pitch.

Men who go to these conventions and those who send them know more than they did a year ago about getting their money's worth out of National Metal Week. It is not so much the fashion as it once was for staff men to give technical sessions the go-by and devote themselves to the old-home-week features. Already some company groups have the practice of covering the sessions and exhibits of most interest to them by a schedule of assignments. A plan that has worked well is to divide up the sessions and exhibits at the beginning of the day and at dinner time have the group members meet for reports. It is a rule with certain companies to hold a conference on the return of their representatives from the convention, a written report being presented by each.

As we have said on another occasion, exhibitors at the Steel Treathers' as well as other conventions are showing more discrimination in the matter of entertainment. The "junketeer," whether in the rôle of bestowing or receiving, is a comparatively rare specimen today. Social amenities are far from being taboo, but, under the influence of a number of leading companies, the wishes of the society executives

are respected and every activity is subordinated to the technical advance which these gatherings have so signally furthered.

## Spirals and Circles in Trade

ACTIVITY begets activity, and vice versa. Always the general trend is moving in an ascending spiral, a descending spiral or a circle. There would not have been such disappointment last April, when it began to be said that "something fresh has gone wrong" if this fact had been kept in mind. Perhaps the worst thing about the stock market collapse was that men were encouraged to set it up as a landmark, a time from which things should be dated as a cause of the things they were observing.

A trade recession began just about July 1, 1923, and things should be dated from then. If the stock market reflected that fact in the four months following it was only by way of its not advancing still more. By the popular view it should have discounted that turn.

Approximately from Oct. 1, 1922, to July 1, 1928, trade was moving in a circle. There was an ascent, but it was not of the spiral character here considered. Population was increasing, things were being done more efficiently and quantity production increased in natural manner with ordinary growth of the country. Costs were reduced and corporate profits increased. There was true prosperity, so far as was observable at the time or can be distinctly seen in the retrospect, the kind of prosperity that carries within itself the means of its perpetuation. It was a healthy activity, activity here supporting activity there, and so on around to the point of beginning.

Then, about the middle of 1928, an ascending spiral was begun. The descending spiral began about July 1, 1929. The only question now is as to its duration and whether it is to be followed by a circle for a time, or immediately by an ascending spiral. These may seem like big questions, leaving much in doubt, but when it appears that many observers have not realized the working of a descending spiral since the date named, or at least have not appreciated the fundamental importance of the principle, it will help to clarify matters to consider the course from this viewpoint.

Can the probable duration of a descending spiral, as such, be estimated? Some observers have gone over the past and hold that not much more than a year has ordinarily been covered at most. Two exceptional cases are counted out, the depression of

the eighteen-seventies by there being no monetary standard and that of the eighteen-nineties by the standard having been threatened.

A spiral reaches completion sooner in ordinary business affairs than in the case of corporate expenditures for improvements, whether public service or private. The first influence may start pushing upward while the second is still pushing downward. Hence it does not seem like a bad guess to assume that a final joining of these forces takes between a year and a year and a half from the time depression sets in. As to the dating there should be no doubt—it should be from the middle of 1929.

## Cartels and Cooperatives

THE Continental steel cartel, one of the most ambitious experiments in industrial adjustment, has fallen into such a precarious condition that it was regarded as virtually dissolved until our cabled report this week told of its being prolonged to the end of the year. Such organizations function successfully only when conditions are on an even keel. In swings up or down, especially the latter, there develop differences of opinion, scrambles for orders, betrayals and finally disruption.

In spite of repeated failures in the past, the desire to allocate markets, with the plan that goes with it to assess fines and pay bonuses, etc., survives. An international zinc cartel is now in the process of formation. (International in the sense of American abstention, our laws excluding any such participation, although American interests in foreign countries are naturally free from such restriction.) The possession of surplus of producing capacity, distributed fairly equally, indicates the need for such arrangements, inasmuch as with such a condition the law of the survival of the fittest is delayed in its operation.

The new application abandons all ideas of price fixing or price stabilization and resolves itself into cooperative marketing. This involves a substantially complete participation, an agreement upon quotas of production, a common selling agency, and a triangular adjustment of production, consumption and price, whereof the last is moved up or down to preserve equilibrium between the other factors.

Theoretically this is a sound economic conception. It is, indeed, just what is done by intelligent monopolies, such as those in nickel internationally and aluminum domestically. For that matter, it underlies the workings of the African diamond pool and our own California fruit cooperatives, wherefore monopoly or near-monopoly is obviously not an essential prerequisite.

When it comes, however, to an international cooperation in a complicated industry there are many difficulties. Quarrels over quotas indicate the need for an arbiter enjoying common confidence. Likewise does the maintenance of equilibrium among production, consumption and price. Even more embarrassing is the advent of new producers. And perhaps most embarrassing of all is the reconciliation of national interests, such as the determination of some country to have certain productions, for na-

tional defense or employment of workers, even at the cost of a direct bonus.

Obviously, general engagement in industrial cooperation will happen only if every producer wants to have it, and the want will not exist unless there be a real fear that *laissez faire* will impair, or even destroy, the fruitfulness of immense capital investments in plants and organizations. Beyond that, public interest may be jeopardized in a wild rush to realize natural resources that are exhaustible. We appreciate this fact in respect to our domestic petroleum industry, which we are now trying to control, with a certain measure of state assistance and with popular approval.

## Copper Mergers and a Tariff

TWO developments in copper promise interesting results. One is mergers and the other is the possibility of a tariff.

Two weeks ago the Phelps Dodge Corporation took over the Nichols organization, the latter a custom smelter. Persistent rumors now prevail that the Kennecott Copper Co. will unite with the American Smelting & Refining Co., or at least take over its copper activities. The latter is also a custom smelter.

Opinions are that the consummation of the mergers may put a stop to the policy of custom smelters to sell copper in dull times at prices under those of the primary producers. Electrolytic copper, which had been "stabilized" at 18 cents for one year up to April this year, has now fallen to 10.75 cents, delivered in the Connecticut Valley—a decline of 40 per cent in less than five months, charged largely to the selling policy of custom smelters. Copper is now generally agreed to be at a profitless level.

The other development comes from outside the United States. In Canada copper from the recently uncovered deposits is being refined at low cost and offered in competition with American copper. While this Canadian prepared product has reached no large tonnages as yet, the possibilities of severe competition are expected to lead to an agitation for copper tariff.

The red metal, which for several years after the war sold at levels below pre-war prices, was finally stabilized by successful organizations among copper producers in the formation of Copper Exporters, Inc., and the Copper Institute. For several years there was plain sailing and profits were eminently satisfactory. Today the picture has decidedly changed and from the producers' standpoint, at least, there is evidently need of a revised rationalization.

## More Coking for the Public

FROM the earliest time it has been notable that the great bulk of the by-product coking has been by steel interests, yet all theory is that a great deal of the bituminous coal used by the public should be put through the by-product coking process, the public then being supplied with both coke and gas. In recent years there has been a slight trend toward a larger proportion of the coke made being by plants other

than those attached to blast furnaces. This trend is virtually certain to become more pronounced henceforth.

The final annual report of the Bureau of Mines on coke in 1929, recently issued, shows that of the 53,411,826 tons (net tons) of by-product coke made in 1929, 77.2 per cent was by furnace plants and 22.8 per cent by other plants. The furnace proportion is the smallest since 1919, although the tonnage made a new record by a wide margin, passing 1928 by 7.8 per cent and 1926, the best year before 1928, by 18.8 per cent. The non-furnace plants increased their output 26.2 per cent from 1926 to 1929.

In the early days the blast furnaces were not particularly quick to adopt by-product coking, not a little of the early construction of ovens being by private interests or utilities. The steel interests had many improvements to make and capital supplies were not unlimited, so that by-product ovens could be given only a share. Later it became easy to finance such construction.

A point has now been reached from which the steel industry has not much further to go. In 1929 approximately 44,000,000 tons of coke was used in the manufacture of pig iron and ferroalloys, and furnace ovens themselves produced 41,224,387 tons of by-product coke. Not all of this was actually used in the associated blast furnaces, there being some sales to the public. There was record production of pig iron last year, and as that was only the second new record made since 1916, in 13 years, one cannot expect blast furnace requirements to increase much in the next few years. By-product coking for the public, on the other hand, is altogether likely to continue its increase, and with production by furnace interests increasing no more than slowly the percentage of coking for the public should steadily increase.

Up to date less than 15 per cent of the total bituminous coal produced is being put through the by-product coking process, while the proportion going into beehive ovens has recently dropped below 2 per cent. There is a wide field for public consumption of coke, particularly in house heating, and the decadence of anthracite production is an important factor in that direction.

The rapidly increasing vogue of natural gas may be an important competitive factor, but natural gas is seeking only the big centers of consumption. Coke oven gas is quite an item already. In 1929 the by-product coke ovens produced, in excess of what they used for heating retorts and wasted, 507,590,579,000 cu. ft., about three-fifths of this being used in steel and affiliated plants, the remainder being marketed. This was about 27 per cent of the volume of natural gas produced, in the neighborhood of 1,850,000,000,000 cu. ft., though allowance must be made for the heat unit content being materially less.

### Speed and Giantism

THE American fetish of speed and giantism has aroused the *Financial Chronicle*, New York, which, in a pungent recounting of present-day attitudes, urges a stop to the unrestrained worship and a return to work, if we would win. The following are selected passages from the editorial, which is

against the driver who constantly strives to pass others on the road:

The momentum of life is too rapid. Society is excited by its endeavors—for pleasure, for progress, for prosperity. We are intent on breaking all the records.

Our popular vocabulary is filled with new words—mechanization, mass-production, stabilization, equalization, cooperation, coordination, stock smashes, farm relief, chain stores, branch and group banks, automobiles, airplanes, radios, mergers, trusts, holding companies, governmental commissions.

Is it necessary to cross the continent in 12½ hr. as a man in a monoplane did the other day? Why strain to go forward faster than normal development would carry us? Why discount the future? Why try to enjoy all the ideas and ideals in the present? Why mortgage the future with enormous debts for future generations to pay that, each man may now possess and enjoy all that any man now has?

The very complications engendered by the rapid "advance" admonish us that "speed" may destroy the equilibrium and accomplishment we have made. Chain stores may prove a rope of sand. Mergers may grow so big as to fall by their own weight, scattering ruin in their wake. Pleasure may dull by its own satiety. A perfect world would be very monotonous. Vast credit may be vast benefit, but it may burst like a bubble.

Any new scheme can get a hearing. We know that government should stay out of business, but we are constantly putting it in by the back door. We realize that multiplying commissions is creating a pseudo-socialism, but we are so eager to "get on" that we seize the government to drive us. Moderation, sure-footedness, normalcy, are no longer watch-words.

We make new labor-saving machines, force them on the market by super-salesmanship, and then mourn over unemployment. We point to mass-production as a great gain, and wonder why consumption does not keep the pace. Trying to reconcile production and consumption, we force consumption as if it were indefinitely extensible.

No one wants to go back—but why go forward so fast when we are not certain where we are going? We are far past the dead days of fifty years ago, when men were satisfied to work rather than wonder and dream. We do not wish to bring back their hardships and privations, but why introduce elements that create envy, suspicion, malice, deceit, enmity, and doubt?

We want shorter hours, fewer work days, more certain employment for those who wish to work, and can find no incentive but the unemployed and higher wages.

We preach the virtues of leisure, culture, enjoyment of life for our workingmen, and try to coerce the employer, who is in the throes of world-competition. We will not keep to the "middle of the road" because we want to pass everybody that's out. We might succeed better if we could, somehow, slow down!



## Greater Interest Shown in Forward Requirements

▲ ▲ ▲  
**P**IG Iron Sellers and Auto  
Parts Makers Receive In-  
quiries for Long-Term Con-  
tracts—Sheet and Strip Book-  
ings Gain.  
▼ ▼ ▼

**S**CATTERED evidences of a breaking away from hand-to-mouth buying, the first deviations from that policy in many months, constitute the feature of the week's news in iron and steel. No sweeping change in the attitude of the trade has yet developed, but the fact that any sizable forward commitments should be negotiated or even considered is sufficient to give the market a more buoyant tone.

Willingness to contract ahead has thus far been most notable among pig iron buyers, with a number of large consumers covering for the remainder of the year and in a few cases through the first half of 1931. Details of transactions are being closely guarded, but recent sales are known to include three of 4000 to 10,000 tons, while inquiries in various parts of the country embrace nine of 2500 to 10,000 tons, the larger ones calling for steel-making iron.

Since no marked increase in the flow of iron and steel to major consuming outlets appears imminent, the broadening of demand is attributed to the belief that prices have struck bottom and that liberal purchases at the present level will prove a good investment. A manifestation of the same conviction is seen in the efforts of some of the motor car makers to place contracts covering their requirements in automobile parts through the first six months of next year.

Greater conservatism rules among buyers of finished steel. More than half of September has passed without bringing an appreciable gain in aggregate bookings. The steel industry's operations, as measured by ingot output, remain unchanged at 58 per cent of capacity.

The chief source of encouragement is an increase in demand for sheets and strip. Thus far in September, specifications for strip steel have been 10 to 20 per cent larger than in the first half of August, while the leading sheet producer's volume of orders last week was the best since April. A fair amount of contracting is reported also, especially in sheets. Scarcely any of this gain in business is attributable to the automobile industry; it is accounted for mainly by the reentry into the market of jobbers and miscellaneous manufacturing consumers who have been rigidly restricting their inventories in recent months. Among the various lines represented are makers of steel barrels and drums, builders of office and store equipment, manufacturers of radios, typewriters and cash registers, and fabricators of farm equipment. An interesting new, although not yet large, outlet for strip steel is the manufacture of equipment and fittings for miniature golf courses.

Tin plate specifications are undiminished and are frequently of an urgent character. Can companies in drought areas find that they overestimated the damage to crops and are pressing tin mills for deliveries. Orders from the Pacific Coast remain very heavy, and tin plate output as a whole is holding at 70 per cent of capacity, with the leading producer running at a considerably higher rate.

Line pipe production is still at a high rate, although interrupted at times when it gets ahead of the work of construction crews in the field. The Republic Steel Corporation has taken an order for a 110-mile natural gas line in the Southwest, requiring 3500 tons of electrically welded pipe.

Fabricated structural steel awards, at 25,000 tons, and inquiries, at 35,000 tons, indicate no significant deviation from the yearly averages to date.

Automobile production this month is now expected to fall below that of August, chiefly on account of model changes by a leading maker of low-priced cars. A moderate gain in October is regarded as possible, but the two final months of the year will probably show the normal seasonal decline. Prospective output of cars and trucks in the United States and Canada for 1930 is estimated at 3,800,000 units, the lowest number since 1927.

Buying of rails and track supplies is getting under way slowly. The Pere Marquette is inquiring for 15,000 tons of rails and the Chesapeake & Ohio is in the market for 8000 tons of track accessories.

The price situation has undergone little change. Scrap markets are quiet, and there have been no new developments in pig iron prices. The success of efforts to stabilize sheet and strip prices is still in doubt, since so many buyers were permitted to contract for their September, and in some cases their fourth quarter, needs at the levels in effect before recent advances were announced.

THE IRON AGE index of industrial construction shows the launching of 98 projects requiring machinery and factory equipment, calling for an expenditure of \$26,500,000, against 79 in the preceding week, totaling \$20,000,000.

Electrolytic copper, at 10½c., is the lowest in 30 years.

The European Steel Cartel has been prolonged until the end of the year, with the fourth quarter production quota reduced 15 per cent.

THE IRON AGE composite prices are unchanged, finished steel at 2.142c. a lb., pig iron at \$16.88 a gross ton and heavy melting scrap at \$13.75 a gross ton.

# PITTSBURGH

## Moderate Seasonal Gains in Steel Orders— Price Structure Lacks Uniformity

PITTSBURGH, Sept. 16.—Restricted seasonal improvement in the iron and steel business is more visible in the Pittsburgh district this week. A number of mills report slight gains in aggregate specifications received during the first half of September as compared to the corresponding August period. As the first week of the month was particularly dull, most of this improvement has developed during the last seven days and is generally accepted as indicative of the current trend.

A healthy feature of the situation is the fact that improved releases are more pronounced in the case of smaller users of steel, such as jobbers and small manufacturing plants. These consumers have restricted their shipments very carefully in the last few months, and their reentry into the market, while seasonable to a large extent, seems to indicate a resumption of the normal flow of steel to the consuming public.

Thus far in September increases in specifications for strip steel have ranged from 10 to 20 per cent, while the leading producer of sheets reports orders last week in the best volume since April. Fabricated structural steel for bridge and industrial work is also more active, and bids have been taken in the last few days on more than 10,000 tons in territory adjacent to Pittsburgh. Highway construction work in Kentucky calls for more than 20,000 tons, on which bids will be in by the end of the week. Reinforcing bars also continue active, and tin plate schedules are still higher, following continued urgent demand from container manufacturers on the Pacific Coast, as well as in other parts of the country. Such concrete evidence of improvement has naturally maintained market sentiment and paved the way for considerable interest in future requirements of many steel consumers.

Of a less favorable nature are reports of continued depression in the automobile industry, despite the efforts of many car manufacturers to promote sales in every possible way. The October schedule of the Ford Motor Co. calls for no change from the restricted September output, while Chevrolet plants are closed this week and next for inventory and model changes. Makers of cars in the medium-priced class, which maintained a rather high production schedule in August, have scaled down operations to keep pace with current demand now that their dealers are properly stocked.

Demand for pipe has fallen off, and the prospects of additional line pipe orders this year are not bright. Rail-

**Steel mills report slight gain in aggregate specifications in first half of September.**

\* \* \*

**Favorable developments include an increase of 10 to 20 per cent in strip orders and larger sheet business.**

\* \* \*

**Fabricated structural steel more active, with bids taken on 10,000 tons in Pittsburgh district.**

\* \* \*

**Unfavorable factors include depression in automobile industry, lack of railroad equipment business, slowness of pickup in agricultural machinery manufacture and probable restriction of rail tonnages soon to be placed.**

\* \* \*

**Price structure lacks uniformity. Official announcements of fourth quarter quotations on some products are lacking.**

road car shops have practically reached the end of their order books and little new business is in prospect. The rail buying movement has not got under way in this district, and reports of probable reduction in the normal requirements of the carriers persist. Agricultural implement makers served by Pittsburgh mills are still studying the farm situation, and have not benefited by export orders which have enabled Chicago plants to step up their production before the usual season.

The price structure lacks uniformity, and larger steel makers seem to be awaiting leadership in the move for price stabilization. Official announcements of fourth quarter quotations are lacking, and mills seem apathetic in solicitation of contracts, because of possible resulting price weakness. The recent move to stabilize sheet and strip prices can hardly be called successful, as larger users are able to secure coverage for the remainder of the year at old prices. The volume of new business in the next two weeks will likely decide the issue.

### Pig Iron

With shipments continuing in about the volume of August, new inquiry is the feature of the market. A non-integrated steel company in the Pittsburgh district is inquiring for 10,000 tons of basic iron for shipment over

the remainder of the year, and a local foundry is in the market for 800 tons of No. 2 iron for October shipment. Other small inquiries have appeared, and considerable quiet negotiation is said to be under way. As recent business has been confined principally to small orders for spot shipment, no test of the price structure has been offered, but the tonnage before the market at the moment promises to clarify the situation considerably. Recent quotations of Cleveland furnaces for outside delivery have brought competition to Valley producers, but little incentive is offered for a change in regular source of supply with consumption at such a low point. If shipments do not improve in the next week or two, a further reduction in furnace operations is contemplated.

*Prices per gross ton, f.o.b. Valley furnace:*

Basic .....	\$18.00
Bessemer .....	18.50
Gray forge .....	17.50
No. 2 foundry .....	18.00
No. 3 foundry .....	17.50
Malleable .....	18.50
Low phos., copper free....	\$26.66 to 27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

*Prices per gross ton, f.o.b. Pittsburgh district furnace:*

Basic .....	\$18.50
No. 2 foundry .....	18.50
No. 3 foundry .....	18.00
Malleable .....	19.00

Freight rates to points in Pittsburgh district range from 63c. to \$1.13.

### Semi-Finished Steel

Buyers are showing little interest in fourth quarter contracts. Sellers are reaffirming present quotations of \$31, Pittsburgh or Youngstown, for billets, slabs or sheet bars. Makers of forging billets have begun to take contracts for the rest of the year at \$36, and specifications are slightly heavier. Wire rods are quiet, and bolt and nut makers are occasionally holding up shipments against present contracts. Producers are naming the prevailing \$36, Pittsburgh or Cleveland, quotation on fourth quarter business.

### Bars, Plates and Shapes

Increased activity in structural steel is the feature of the market on heavy hot-rolled products this week. In the past few days local fabricators have bid on projects requiring about 10,000 tons of steel, exclusive of the 20,000 tons required for bridge work in Kentucky. None of this work is in the immediate Pittsburgh district, where little activity is in immediate prospect, with the exception of the West End-North Side bridge over the Ohio River, on which plans are approaching completion. Awards are being made on part of the Kentucky State highway bridge work, and bids

# A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous,  
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	Sept. 16, 1930	Sept. 9, 1930	Aug. 19, 1929	Sept. 17, 1929
No. 2 fdy., Philadelphia.....	\$19.76	\$19.76	\$19.76	\$21.26
No. 2, Valley furnace.....	18.00	18.00	18.00	18.50
No. 2, Southern, Cin'tl.....	15.69	15.69	15.69	17.19
No. 2, Birmingham.....	14.00	14.00	14.00	14.50
No. 2 foundry, Chicago*.....	17.50	17.50	17.50	20.00
Basic, del'd eastern Pa.....	18.75	18.75	18.75	19.75
Basic, Valley furnace.....	18.00	18.00	18.00	18.50
Valley Bessemer, del'd P'gh.....	20.26	20.26	20.26	20.76
Malleable, Chicago*.....	17.50	17.50	17.50	20.00
Malleable, Valley.....	18.50	18.50	18.50	19.00
L. S charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.....	94.00	94.00	94.00	105.00

Rails, Billets, Etc., Per Gross Ton:	Sept. 16, 1930	Sept. 9, 1930	Aug. 19, 1929	Sept. 17, 1929
Rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh.....	31.00	31.00	31.00	35.00
Sheet bars, Pittsburgh.....	31.00	31.00	31.00	35.00
Slabs, Pittsburgh.....	31.00	31.00	31.00	35.00
Forging billets, Pittsburgh.....	36.00	36.00	36.00	40.00
Wire rods, Pittsburgh.....	36.00	36.00	36.00	42.00
Skelp, grvd. steel, P'gh, lb.....	1.70	1.70	1.70	1.85

Finished Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.60	1.60	1.65	1.95
Bars, Chicago.....	1.70	1.70	1.75	2.05
Bars, Cleveland.....	1.65	1.70	1.70	1.95
Bars, New York.....	1.93	1.93	1.98	2.29
Tank plates, Pittsburgh.....	1.60	1.60	1.60	1.95
Tank plates, Chicago.....	1.70	1.70	1.75	2.05
Tank plates, New York.....	1.88	1.88	1.88	2.22½
Structural shapes, Pittsburgh.....	1.60	1.60	1.60	1.95
Structural shapes, Chicago.....	1.70	1.70	1.75	2.05
Structural shapes, New York.....	1.80½	1.80½	1.85½	2.19½
Cold-finished bars, Pittsburgh.....	2.10	2.10	2.10	2.30
Hot-rolled strips, Pittsburgh.....	1.65	1.65	1.65	1.90
Cold-rolled strips, Pittsburgh.....	2.35	2.35	2.35	2.75

\*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Finished Steel, Per Lb. to Large Buyers:	Sept. 16, 1930	Sept. 9, 1930	Aug. 19, 1929	Sept. 17, 1929
Sheets, black, No. 24, P'gh.....	2.40	2.40	2.45	2.85
Sheets, black, No. 24, Chicago.....	2.50	2.50	2.55	2.95
dist. mill.....	3.00	3.00	3.05	3.50
Sheets, galv., No. 24, P'gh.....	3.10	3.10	3.15	3.60
dist. mill.....	2.05	2.05	2.05	2.35
Sheets, blue, No. 13, P'gh.....	2.25	2.25	2.25	2.45
Sheets, blue, No. 13, Chicago.....	2.00	2.00	2.05	2.45
Wire nails, Pittsburgh.....	2.10	2.10	2.10	2.50
Wire nails, Chicago dist. mill.....	2.30	2.30	2.30	2.40
Plain wire, Pittsburgh.....	2.35	2.35	2.35	2.45
Barbed wire, galv., Pittsburgh.....	2.70	2.70	2.80	3.20
Barbed wire, galv., Chicago.....	2.85	2.85	2.85	3.30
dist. mill.....	\$5.25	\$5.25	\$5.25	\$5.35
Tin plate, 100 lb. box, P'gh.....				

Old Material, Per Gross Ton:	Sept. 16, 1930	Sept. 9, 1930	Aug. 19, 1929	Sept. 17, 1929
Heavy melting steel, P'gh.....	\$15.75	\$15.75	\$15.25	\$18.25
Heavy melting steel, Phila.....	13.00	13.00	12.50	16.50
Heavy melting steel, Ch'go.....	12.50	12.50	12.00	15.00
Carwheels, Chicago.....	13.50	13.50	13.50	14.00
Carwheels, Philadelphia.....	15.00	15.00	14.50	16.50
No. 1 cast, Pittsburgh.....	13.50	13.50	13.50	15.50
No. 1 cast, Philadelphia.....	13.00	13.00	13.00	16.50
No. 1 cast, Ch'go (net ton).....	11.50	11.50	12.00	14.50
No. 1 RR. wrot., Phila.....	15.00	15.00	15.00	16.00
No. 1 RR. wrot., Ch'go (net).....	10.00	10.00	10.00	14.00

Coke, Connellsville, Per Net Ton at Oven:	Sept. 16, 1930	Sept. 9, 1930	Aug. 19, 1929	Sept. 17, 1929
Furnace coke, prompt.....	\$2.60	\$2.60	\$2.60	\$2.65
Foundry coke, prompt.....	3.50	3.50	3.50	3.75

Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	10.87½	11.12½	11.12½	18.12½
Electrolytic copper, refinery.....	10.25	10.50	10.75	17.75
Tin (Straits), New York.....	29.87½	29.87½	30.20	45.00
Zinc, East St. Louis.....	4.25	4.30	4.40	6.80
Zinc, New York.....	4.60	4.65	4.75	7.15
Lead, St. Louis.....	5.35	5.35	5.35	6.70
Lead, New York.....	5.50	5.50	5.50	6.90
Antimony (Asiatic), N. Y.....	7.75	7.75	7.75	8.75

will be closed this week on the remainder. The Mount Vernon Bridge Co. has been awarded a bridge across the Ohio River at Ashland, Ky., which will take about 5000 tons.

The reinforcing bar business also continues very active, at least from the standpoint of shipments, and some new work is coming out from time to time. Otherwise, bars are rather dull. The market is featured by somewhat heavier inquiries, but this is to be expected in the closing days of the quarter, and tonnage releases show no appreciable improvement.

Plates are finding their heaviest demand in the fabrication of tanks for the oil and gas industry. Barge yards are reaching the end of their present commitments and new orders are slow in being placed, in spite of the fact that the shortage of river craft is very pronounced in this district. Railroad car builders are taking little material, and scarcely any new inquiry is coming out which might bolster up order books.

Mills contemplate no change in prices for the fourth quarter, although no official announcements have been made. Nevertheless, the attitude of sellers seems somewhat firmer, and some of them are making

little effort to solicit forward business because of the probable price weakening which might result. Bars remain quotable at 1.60c. to 1.65c., Pittsburgh, with the latter figure generally named on forward business. On plates and shapes, there is little tendency to seek higher prices than 1.60c., Pittsburgh.

## Rails and Track Accessories

The railroads are just beginning to seek prices on their fourth quarter steel requirements, and scattered inquiry for track accessories is before the market. In this district rail buying has not got under way, but will be at its height within the next month. The Erie Railroad is inquiring for its railroad steel requirements for the last three months of the year.

## Tubular Goods

The pipe market has been very dull since Labor Day, and aggregate business is not up to the level of the corresponding August period. Standard or butt-weld pipe is even moving less actively than in the summer, and operations are at 40 per cent of capacity. Not much of the line pipe inquiry before the trade is expected to be acted upon this fall. Shipments of drill pipe to the oil fields are not

heavy, although conditions seem to be improving in the California fields.

## Wire Products

Producers are willing to take contracts for the fourth quarter at present levels, although most of them have not officially opened their books. Business is little better than it was last month, and has actually fallen off with some companies. This is especially true of merchant wire products, which are not moving into the farming area at a very rapid rate. Nails are quoted at \$2.05 a keg for Pittsburgh delivery, and \$2 for shipment to competitive districts. The latter price is also said to be available on desirable tonnage in this immediate territory. Manufacturers' wire is holding at 2.30c., Pittsburgh.

## Sheets

Specifications have shown a rather marked improvement in the case of some companies, and consumers are showing more interest in their future requirements. This has resulted in a fair amount of fourth quarter contracting, as well as a slightly firmer price tone. Preferred customers have been able to cover for the remainder of the year at recent low figures. On



## THE IRON AGE COMPOSITE PRICES

		Finished Steel		Pig Iron		Steel Scrap	
Sept. 16, 1930		2.142c. a Lb.		\$16.88 a Gross Ton		\$13.75 a Gross Ton	
One week ago		2.142c.		16.88		13.75	
One month ago		2.156c.		16.88		13.25	
One year ago		2.398c.		18.29		16.58	
		Based on steel bars, beams, tank plates, wire, rails, black pipe and sheets. These products make 87 per cent of the United States output.		Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.		Based on heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.	
		High	Low	High	Low	High	Low
1930.....	2.362c., Jan. 7;	2.142c., Aug. 26	\$18.21, Jan. 7;	\$16.88, Aug. 12	\$15.00, Feb. 18;	\$13.08, July 1	
1929.....	2.412c., April 2;	2.362c., Oct. 29	18.71, May 14;	18.21, Dec. 17	17.58, Jan. 29;	14.08, Dec. 3	
1928.....	2.391c., Dec. 11;	2.314c., Jan. 3	18.59, Nov. 27;	17.04, July 24	16.50, Dec. 31;	13.08, July 2	
1927.....	2.453c., Jan. 4;	2.293c., Oct. 25	19.71, Jan. 4;	17.54, Nov. 1	15.25, Jan. 11;	13.08, Nov. 22	
1926.....	2.453c., Jan. 5;	2.403c., May 18	21.54, Jan. 5;	19.46, July 13	17.25, Jan. 5;	14.00, June 1	
1925.....	2.560c., Jan. 6;	2.396c., Aug. 18	22.50, Jan. 13;	18.96, July 7	20.83, Jan. 13;	15.08, May 5	

black sheets mills are quoting 2.45c. Pittsburgh, on galvanized 3c. to 3.10c., on light plates and blue annealed sheets 2c. and 2.15c., and on automobile body sheets 3.60c.

An encouraging aspect in the present tonnage improvement is the fact that practically none of the increase is accounted for by automobile companies. Makers of steel barrels and drums, farm implement manufacturers, and builders of office equipment and radios are accounting for most of the current tonnage, while the automobile industry is barely maintaining its recent releases. Little improvement is expected from the latter source during the remainder of this year, but if business from other sources continues to show gains the sheet industry could improve its operating schedules considerably. Last week mills were running at about 50 per cent of capacity, with expectation of a slight gain this week.

### Tin Plate

Releases from container manufacturers are comparatively heavy, and are generally of an urgent character. Can companies in territories which were thought to have been seriously affected by drought conditions have found that they had overestimated the damage in some cases and are pressing the can makers for deliveries. The movement to the Pacific Coast continues very heavy, and the tin plate industry is maintaining its schedules at 70 per cent of capacity or better, with the leading interest running at a considerably higher rate.

### Strip Steel

Specifications so far this month are running 10 to 20 per cent ahead of the corresponding July and August periods, and mill schedules are slightly higher. Current operations average 30 to 40 per cent of capacity, which is a slight improvement over schedules during the last two weeks of August. Makers of office and store equipment are fairly busy, and radio manufacturers are maintaining recent improved releases. Scarcely any betterment is reported from the automobile industry, and its strip requirements have contributed little to recent tonnage increases. Producers are naming 1.65c. and 1.70c. on hot-rolled strip for fourth quarter deliv-

ery, and 2.35c. and 2.45c. on cold-rolled.

### Cold-Finished Steel Bars

Specifications for the first half of the month are a shade heavier than they were in August, and the price structure shows no further weakening. Mills are making strenuous efforts to hold the 2.10c., Pittsburgh, quotation on fourth quarter business, and are meeting with considerable success except in the case of preferred customers in the Detroit area.

### Coal and Coke

The volume of business in furnace coke has not increased materially, but production has been better adjusted to consumption, and the market has a generally firmer tone. Sellers are naming \$2.60 to \$2.65 on current business, and scarcely any deviations are reported. Shipments of foundry coke are slightly heavier, and prices are unchanged. The coal market is marking time, pending the development of domestic demand. Fuel for industrial purposes and railroads is still in reduced volume.

### Warehouse Prices, f.o.b. Pittsburgh

	*Base per Lb.
Plates.....	2.85c.
Structural shapes.....	2.85c.
Soft steel bars and small shapes.....	2.75c.
Reinforcing steel bars.....	2.75c.
Cold finished and screw stock—	
Rounds and hexagons.....	3.35c.
Squares and flats.....	3.85c.
Bands.....	3.10c.
Hoops.....	4.10c.
Black sheets (No. 24), 25 or more bundles.....	3.25c.
Galv. sheets (No. 24), 25 or more bundles.....	3.85c.
Light plates, blue annealed (No. 10), 1 to 24 plates.....	2.50c.
Blue annealed sheets (No. 12).....	2.65c.
Galv. corrug. sheets (No. 28), per square.....	\$4.25
Spikes, large.....	3.40c.
Small.....	3.80c. to 5.25c.
Boat.....	3.80c.
Track bolts, all sizes, per 100 count.....	60 and 10 per cent off list
Machine bolts, 100 count.....	60 and 10 per cent off list
Carriage bolts, 100 count.....	60 and 10 per cent off list
Nuts, all styles, 100 count.....	60 and 10 per cent off list
Large rivets, base per 100 lb.....	\$3.30
Wire, black, soft ann'd, base per 100 lb.....	\$2.60 to 2.70
Wire, galv. soft, base per 100 lb.....	3.20 to 3.30
Common wire nails, per keg.....	2.35
Cement coated nails, per keg.....	2.65 to 2.80

\*On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 3999 lb.

### Old Material

Purchases by mills of comparatively small tonnages of both No. 1 heavy melting steel and hydraulic compressed sheets have justified recent quotations of \$15.50 to \$16 on steel and \$15 to \$15.50 on hydraulic bundles. Although reports of a sale of steel at more than \$16 have been current, no verification is obtainable. Hydraulic bundles at \$15.50 cannot move from the Detroit district with any profit to dealers, but that figure seems to be justified by shipment of local origin. Hand-bundled sheets have declined rather sharply following hold-ups at consuming points, and heavy breakable cast is weaker. Railroad specialties continue strong and other grades of scrap are holding at recent levels. Most of the buying in recent weeks has been done by a single consumer, and other users, with low operations and plentiful supplies of scrap, are not inclined to enter the market. Under these circumstances the future trend is rather hard to gage, but any increase in open-hearth production by leading independent companies would undoubtedly bring out higher scrap prices.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel.....	\$15.50 to \$16.00
No. 2 heavy melting steel.....	13.00 to 13.50
Scrap rails.....	15.00 to 15.50
Compressed sheet steel.....	15.00 to 15.50
Bundled sheets, sides and ends.....	
Cast iron carwheels.....	15.00 to 15.50
Sheet bar crops, ordinary.....	15.50 to 16.00
Heavy breakable cast.....	11.00 to 11.50
No. 2 railroad wrought.....	15.50 to 16.00
Hvy. steel axle turnings.....	12.50 to 13.00
Machine shop turnings.....	8.00 to 8.50
Acid Open-Hearth Grades:	
Railr. knuckles and couplers.....	17.50 to 18.00
Rail. coil and leaf springs.....	17.50 to 18.00
Rolled steel wheels.....	17.50 to 18.00
Low phos. billet and bloom ends.....	20.00 to 21.00
Low phos. mill plates.....	17.00 to 17.50
Low phos. light grades.....	17.00 to 17.50
Low phos. sheet bar crops.....	18.00 to 18.50
Heavy steel axle turnings.....	12.50 to 13.00
Electric Furnace Grades:	
Low phos. punchings.....	17.00 to 17.50
Heavy steel axle turnings.....	12.50 to 13.00
Blast Furnace Grades:	
Short shoveling steel turnings.....	8.75 to 9.25
Short mixed borings and turnings.....	8.75 to 9.25
Cast iron borings.....	8.75 to 9.25
Rolling Mill Grades:	
Steel car axles.....	21.50 to 22.50
Cupola Grades:	
No. 1 cast.....	13.00 to 14.00
Rails 3 ft. and under.....	16.50 to 17.00

# CHICAGO

## Prices Uppermost in Steel Market—Pig Iron Stronger After Declines

CHICAGO, Sept. 16.—Prices are of paramount interest in the local iron and steel market. The generally accepted thought relating to use of iron and steel seems to be that improvement will be slow, but nevertheless a reality during the fall months. With this subject thus considered, both buyers and sellers turn their attention to the price structure.

Pig iron, which a week ago seemed destined to drop to a \$17 a ton level, appears to have gained strength and is holding at present quotations pending tests which will be given by several large inquiries now before the trade. The situation as to plates, shapes and bars appears to be one in which prices have firmed on small and mixed lots, leaving in general only the more attractive tonnages to bring out the 1.70c. a lb. price.

The question as to how far prices can stiffen or whether or not advances can be put in effect seems to hinge on the appraisal of business by consumers. Little in the way of future tonnage is being sought by consumers, and heavy tonnage outlets for steel mill products are extremely quiet. Steel mill sales this week give no hint of the beginning of a buying movement, though purchases are in sufficient volume to hold backlogs steady, and specifications assure ingot output of 57 per cent of capacity, but the fact that books are not growing injects uncertainty into the entire picture. Taken as a whole, those interested in the market seem better satisfied as to the price situation, but they are confused as to the outlook as gaged by volume movement of iron and steel commodities.

### Pig Iron

The past week has been one of erratic movements in prices for pig iron. Seven days ago the market seemed definitely pointed to a \$17 a ton level. By mid-week Northern iron had moved at 25c. to 50c. a ton under this figure. However, the upheaval seems to have quieted as fast as it appeared, and \$17.50 a ton appears now to be a firm price.

Several large inquiries are before the trade and tests will soon be afforded. A melter in Illinois is in the market for 2000 tons of Northern iron and 400 tons of silvery. Another inquiry calls for 5000 tons of basic, and still another is for 2000 tons of foundry iron. A cargo of 3500 tons of Lake Erie iron has been unloaded at Milwaukee and Chicago. Weakness in the silvery market is again reflected by the movement of a tonnage of 10 per cent at about \$1.50 under the schedule.

Shipments of Northern iron are running 10 per cent heavier than in the first part of August, and releases

Efforts to strengthen steel prices of outstanding interest in market developments.

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Pig iron stronger after price dips in the week. Larger inquiries appear.

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Steel sales give no hint of beginning of real buying movement.

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Lack of volume demand confuses the outlook for the nearby future.

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Scrap marking time, but in the main holds its recently gained strength.

point to expanding use as the current month wears on.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	\$17.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	18.00
Malleable, not over 2.25 sil.	17.50
High phosphorus	17.50
Lake Super. charc'l, sil. 1.50	27.04
S'th'n No. 2 fdy. .... \$18.01 to	18.51
Low phos., sil. 1 to 2, cop-per free	29.50
Silvery, sil. 8 per cent....	26.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

### Plates

The most encouraging phase of this market is the continued heavy rate of shipment to the Milwaukee pipe maker. Schedules at that plant are said to be well arranged for some time to come. However, it is quite noticeable that little information is available concerning moves that would assure additional tonnage of steel for line pipe manufacture. Word comes from the Southern Natural Gas Corp'n. that it will build a 67-mile line of 12½-in. pipe from Mobile, Ala., to Pensacola, Fla.

Of importance in this market is 20,000 tons of tank steel pending award. The bulk of this tonnage is on inquiry from producers in the Oklahoma fields. It is reported here that these tanks will be necessary if control of oil well output is discontinued, a move which is now under consideration. On the other hand, if control of well flow remains in effect it is quite probable that only a small part of the pending inquiries will be turned into orders. Fresh inquiries are for 1800 tons.

There is no life in the railroad equipment field and, with car shops nearing very low rates of output, the

Western plate market can look in this direction for little or no support.

The price situation remains as it was a week ago. Producers are anxious to see prices hold at present quotations or even to advance to 1.75c. a lb., Chicago, as the minimum. However, the market lacks the support of tonnage, either for immediate use or for delivery during the remainder of the year.

### Structural Material

This has been another lean week in the Chicago structural market. Awards, at 4000 tons, comprise numerous small projects widely scattered from Chicago to the Rocky Mountain region. Fresh inquiries, at 3000 tons, are discouragingly small.

There is some talk here that bids will soon be asked for the first sections of Chicago's subway. Fabricators feel, however, that many reports of similar kind are political moves and that actual construction cannot reasonably start before the early part of 1931.

Prices for structural steel are steady at 1.70c. to 1.75c. a lb., Chicago.

### Warehouse Business

The upturn in new orders noted about 10 days ago continues to make slow but sure headway, thereby giving evidence that warehousemen are to experience some measure of increase in seasonal demand. It is significant that orders are coming from a wider circle of buyers, many of whom have been out of the market for many weeks. Prices are steady for most commodities out of warehouses.

### Bars

Use of bars is making gains, but there is no indication that demand will take a sharp upturn. Several large inquiries for fourth quarter delivery are before the trade, but these prospective buyers do not show the keen interest usually displayed when future commitments are being made for business that is more or less assured.

In the meantime, producers of mild steel bars are studying the possibility of naming 1.75c. a lb., Chicago, as the minimum, and are considering establishing this level for fourth quarter and cancelling unspecified tonnages as of Oct. 1. They are faced, however, with a market condition which may not support advances in prices. Agricultural implement manufacturers are taking much time in planning fall production schedules. They are finding little support in the local market and future orders for export are uncertain.

Use of alloy steel bars is sluggish, and such growth as has taken place

in recent weeks is far less than had been expected by sellers. The iron bar market is without feature. Sellers of rail steel bars are holding to 1.65c., Chicago Heights, which is only \$1 a ton under the minimum for mild steel bars. Production of hard steel bars is making slow gains as orders, though still of small individual size, increase in number and frequency.

### Rails and Track Supplies

Outstanding in this market are inquiries from the Chesapeake & Ohio for 5000 tons of angle bars and 3000 tons of spikes and bolts. It is reported that tie plates will be asked for in the near future. Releases against old commitments for track fastenings are heavier than in the previous week and spot purchases of small lots are also on the increase. The rail market remains quiet except that several Western railroads are said to be preparing their estimates for 1931 delivery. It is not at all unlikely that definite inquiries will be out before the end of the month.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. Per lb.: Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.07½c. to 2.15c.; angle bars, 2.75c.

### Cast Iron Pipe

Strength in prices for cast iron pipe is shown by recent prices paid by Racine, Wis. The United States Pipe & Foundry Co. was successful bidder on 590 tons of 24-in. Class C pipe at \$44.75 a ton, delivered, which is equivalent to \$36.35 a ton, Birmingham. The Mahoning Valley Sanitary District is in the market for 500 tons of pipe for use near Niles, Ohio. Hillsboro, Wis., will open bids this week on 200 tons. Private buying is spotty and is largely in carload lots.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$44 to \$46; 4-in., \$47 to \$49; Class A and gas pipe, \$3 extra.

### Wire Products

Shipments of the so-called common products, wire fencing and nails, show moderate improvement to many sections of the country, including some parts of the drought-affected areas. The manufacturing trade is showing little interest in the market, and orders from this source are far behind those of a year ago. Although final quarter books have been open for several weeks, few orders have been taken for delivery during the remainder of the year.

### Sheets

Advances in prices announced a week ago by several producers are now more or less generally adopted. New business in the last week has shown gains, but virtually all of the tonnage placed is for nearby shipment, it still being quite evident that users are not prepared to commit themselves for the remainder of the year. Black sheets are slowly firming toward 2.50c. a lb., Chicago district mill, and quotations on galvanized sheets are working upward to the 3.20c. level. The normal period in which the roofing trade usually makes

known its full fall requirements is now past, and sellers are looking for little tonnage from this source for some time to come.

Output of sheets has gained five points to 55 per cent of capacity, but books are light and uncertainty exists as to the rate of production in the coming week.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.55c. to 2.60c.; No. 24 galv., 3.15c. to 3.25c.; No. 10 blue ann'd, 2.15c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

### Reinforcing Bars

This market is in the doldrums in all phases excepting road work, and even in this case there is doubt that programs now under way will be carried to completion in the calendar year. Current quotations on billet steel reinforcing bars out of Chicago warehouses are nominal because of demoralization resulting from keen competition.

Rail steel bars going into road work being 1.65c. a lb. and hard steel bars for bridges and culverts are priced at 1.75c. a lb. For building work, the quotation for attractive tonnages is as low as 1.50c.

### Bolts, Nuts and Rivets

Demand appears to have made no headway in the past week. Contracts for the final quarter are still being passed to the trade. Prices remain unchanged on the ordinary run of these commodities. However, the keenness of competition is striking at the market, as shown by cutting of quotations on orders that can be classed as special. Also a signed contract does not always stand in the way of buyers seeking competitive prices in the open market.

### Coke

Shipments of by-product foundry coke show moderate gains as the melt

of foundry iron grows heavier. The price is steady at \$8 a ton, f.o.b. local ovens.

### Old Material

The Chicago scrap market appears to be a puzzle to buyers and sellers alike. Buying this week has been in small lots. Users are not seeking large quantities and dealers are finding it difficult to cover shipping instructions, not because demand is at all heavy, but for the reason that incoming shipments are light. Some producers have gained the impression that prices are to advance and they are holding output for higher bids. The railroads continue to issue lists from time to time, but the tonnages offered clearly indicate only moderate attention is being given to gathering scrap.

Several large users have refused to consider heavy melting steel at \$13 a gross ton, delivered, and also have made no counter offers, which is somewhat surprising to the trade.

Railroad offerings include 5000 tons by the Santa Fe, 2000 tons by the Rock Island and 1500 tons by the Burlington.

Prices deliv'd Chicago district consumers:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel.....	\$12.50 to \$13.00
Shoveling steel.....	12.50 to 13.00
Frogs, switches and guards, cut apart, and misc. rails	13.00 to 13.50
Hydral. compressed sheets	10.25 to 10.75
Drop forge flashings.....	8.60 to 9.00
No. 1 busheling.....	9.50 to 10.00
Forg'd cast and r'd steel carwheels.....	15.00 to 15.50
Railroad tires, charg. box size.....	15.50 to 16.00
Railroad leaf springs cut apart.....	15.50 to 16.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	12.50 to 14.00
Coil springs.....	16.00 to 16.50
Electric Furnace Grades:	
Axle turnings.....	11.25 to 11.75
Low phos. punchings.....	13.00 to 13.50
Low phos. plates, 12 in. and under.....	13.00 to 13.50
Blast Furnace Grades:	
Axle turnings.....	9.50 to 10.00
Cast iron borings.....	7.75 to 8.25
Short shoveling turnings..	7.75 to 8.25
Machine shop turnings....	6.00 to 6.50
Rolling Mill Grades:	
Iron rails.....	13.00 to 13.50
Rerolling rails.....	14.50 to 15.00
Cupola Grades:	
Steel rails, less than 3 ft..	14.00 to 14.50
Steel rails, less than 2 ft..	14.75 to 15.25
Angle bars, steel.....	13.50 to 14.00
Cast iron carwheels.....	13.50 to 14.00
Malleable Grades:	
Railroad.....	13.50 to 14.00
Agricultural.....	12.50 to 12.75
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heavy.....	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angle and splice bars.	12.00 to 12.50
Iron arch bars and transoms.....	13.50 to 14.00
Iron car axles.....	21.50 to 22.00
Steel car axles.....	15.00 to 15.50
No. 1 railroad wrought....	9.75 to 10.25
No. 2 railroad wrought....	11.00 to 11.50
No. 1 busheling.....	7.50 to 8.00
No. 2 busheling.....	6.00 to 6.50
Locomotive tires, smooth..	14.50 to 15.00
Pipes and flues.....	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast....	11.50 to 12.00
No. 1 railroad cast.....	10.00 to 10.50
No. 1 agricultural cast....	9.50 to 10.00
Stove plate.....	9.50 to 10.00
Grate bars.....	8.50 to 9.00
Brake shoes.....	8.50 to 9.00

\*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

### Warehouse Prices, f.o.b. Chicago

Base per Lb.	
Plates and structural shapes.....	3.00c.
Soft steel bars.....	2.90c.
Reinforc'g bars, billet steel—	
Less than 5 tons.....	2.85c.
5 tons to 30 tons.....	2.45c.
30 tons to 200 tons.....	2.00c.
200 tons and over.....	1.85c.
Rail steel reinforcement—	
Less than 5 tons.....	2.50c.
5 tons to 30 tons.....	2.10c.
30 tons and over.....	1.50c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.35c.
Flats and squares.....	3.85c.
Bands (¾ in. in Nos. 10 and 12 gages).....	3.10c.
Hoops (No. 14 gage and lighter)...	3.65c.
Black sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.35c.
Blue ann'd sheets (No. 10).....	3.35c.
Spikes (¾ in. and larger).....	3.55c.
Track bolts.....	4.55c.
Rivets, structural.....	4.00c.
Rivets, boiler.....	4.00c.
Per Cent Off List	
Machine bolts.....	60 and 10
Carriage bolts.....	60 and 10
Coch or lag screws.....	60 and 10
Hot-pressed nuts, sq. tap. or blank,	60 and 10
Hot-pressed nuts, hex., tap. or blank,	60 and 10
No. 8 black ann'd wire, per 100 lb. ....	\$3.45
Com. wire nails, base per keg.....	\$2.30 to 2.55
Cement c'd nails, base per keg.....	2.30 to 2.55



# CLEVELAND

## Pere Marquette Inquires for Rails—Steel Orders Only Slightly Better

CLEVELAND, Sept. 16.—The upturn in the demand for finished steel has been very slight so far this month. While the market shows more life than in August, orders are so small that there has been little increase in tonnage.

Steel plant operations in Cleveland were increased this week by the starting of two open-hearth furnaces. Local mills are now running at 47 per cent of ingot capacity, a gain of seven points.

The most interesting news from the automotive industry is that some of the motor car manufacturers are endeavoring to place contracts for parts for their requirements through the first half of next year. This is taken to mean that they do not expect that they will be able to buy at lower prices than at present. Business from the motor car industry is confined to small lots for early requirements and little improvement is expected in orders from that source during the remainder of the year. Some metal-working industries are operating slightly better than last month, and October is expected to bring a further seasonal improvement.

The Pere Marquette Railroad is inquiring for 13,000 to 15,000 tons of rails for its 1931 requirements.

Efforts to put prices on a higher base so far have not met with much success.

### Pig Iron

Sales increased somewhat during the week. One interest sold 8000 tons in lots from 1000 tons down to carloads. Furnaces are getting a large number of car lot orders from foundries that are buying iron only as needed. Some foundries are purchasing for their requirements for the remainder of the year. While a number of Cleveland foundries bought small lots during the week, this activity was not stimulated by the recent 50c. a ton price reduction. Little new business is coming from the motor car industry.

There is no change in the price situation. Lake furnaces quote foundry and malleable iron at \$16.75 and \$17, with concessions to \$16.50 in some cases for shipment to competitive points. For Cleveland, the price is \$17.50, furnace. In Michigan, the price is unchanged at \$18.

#### Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	\$17.50
S'th'n fdy., sil. 1.75 to 2.25	\$18.51 to 19.51
Malleable	17.50
Ohio silvery, 8 per cent.	25.50
Basic Valley furnace	18.50
Stand. low phos., Valley	27.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 50c. average local switching charge; \$3 from Jackson, Ohio; \$6.01 from Birmingham.

### Bars, Plates and Shapes

Plate orders from boiler and tank

shops gained the past week. Demand for bars and structural shapes showed little change. Mills are getting a fair number of bar orders, but they are for small lots. Little new work is coming out in the building field. An order for 320 tons of sheet steel piling was placed for a Toledo dock. Steel bars, plates and shapes are generally quoted at 1.60c., Pittsburgh, and a few fourth quarter contracts have been taken at that price. Following weakness reported last week in the local bar market, the price is definitely \$1 a ton lower, or 1.65c. for Cleveland delivery and 1.60c. for desirable lots for outside shipment. For small and assorted lots, 1.65c. is quoted.

### Strip Steel

Most of the mills have come out with prices of 1.65c., Pittsburgh, for wide strip and 1.75c. for narrow for the fourth quarter. However, large consumers are still specifying against contracts placed recently at 1.60c. for wide and 1.70c. for narrow and, as no interest is being shown in fourth quarter contracts, the advance in the asking price is untested. The price spread of 2.35c. to 2.45c., Cleveland, continues on cold-rolled strip. At least one mill is quoting the lower price for car lots for the fourth quarter.

### Sheets

While the tone of the market is firmer, the price situation is rather unsettled and it is yet to be determined whether efforts to put general price advances in effect for the fourth quarter will prove successful. At least one mill is offering to close contracts with its regular customers for auto body sheets at 3.50c., with a 25c. differential for deep drawing until Sept. 27, after which it announces that its price will be 3.60c. and its differential 35c. Another mill is taking current orders at 3.50c. Black sheets still range from 2.35c. to 2.45c., the latter being the general asking price for the fourth quarter. Some mills are holding to the higher price for current orders and are making sales

### Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes	2.95c.
Soft steel bars	2.85c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex.	3.40c.
Cold-fin. flats and sq.	3.90c.
Hoops and bands, No. 12 to 14 in., inclusive	3.10c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip	5.95c.
Black sheets (No. 24)	3.60c.
Galvanized sheets (No. 24)	4.35c.
Blue ann'l'd sheets (No. 10)	3.10c.
No. 9 ann'l'd wire, per 100 lb.	\$2.50
No. 9 galv. wire, per 100 lb.	2.95
Com. wire nails, base per keg	2.40

\*Net base, including boxing and cutting to length.

on that basis. Jobbing mills quote blue annealed sheets at 2c. for No. 10 and 2.15c. for No. 13, continuous mills going \$2 to \$4 a ton lower. On metal furniture sheets there is a spread of 3.60c. to 3.70c. Sheet orders continue light from all industries.

### Bolts, Nuts and Rivets

Rivet manufacturers have reaffirmed for the fourth quarter the present price of \$2.75, Cleveland and Pittsburgh, for large rivets and 70, 10 and 5 per cent off list for small rivets. Present discounts on bolts and nuts probably will be reaffirmed for the coming quarter the latter part of this week. Demand for these products continues slow.

### Semi-Finished Steel

Specifications have increased slightly, and the leading producer has put on two additional open-hearth furnaces and is now operating at 50 per cent of capacity. The present \$31 price for sheet bars, billets and slabs probably will be reestablished for the fourth quarter.

### Wire Products

Manufacturers' wire is moving slightly better than recently, and is firm at 2.30c. Nails to jobbers appear to have definitely settled to \$2 a keg in this territory.

### Old Material

Expected releases during the latter part of the week by a Cleveland consumer which has taken no scrap for several weeks have put dealers in a more cheerful mood. There is no new demand from consumers. Activity is confined to purchases against Valley district contracts by dealers who are paying \$14.50 for heavy melting steel and \$14 for compressed sheet steel.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	\$11.75 to \$12.25
No. 2 heavy melting steel	11.25 to 11.50
Compressed sheet steel	12.25 to 12.50
Light bundled sheet	
stampings	11.00 to 11.50
Drop forge flashings	10.00 to 10.50
Machine shop turnings	8.00 to 8.50
Short shoveling turnings	9.75 to 10.25
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	14.00 to 14.50
No. 1 busheling	11.75 to 12.00
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops	17.75 to 18.00
Low phos., billet bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings	9.00 to 9.25
Mixed borings and short turnings	9.00 to 9.25
No. 2 busheling	8.75 to 9.00
Cupola Grades:	
No. 1 cast	15.00 to 15.50
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.50 to 19.50
Miscellaneous:	
Rails for rolling	16.25 to 16.50
Railroad malleable	16.00 to 16.50

# NEW YORK

## Pig Iron Business Broadening—Steel Prices Firming

NEW YORK, Sept. 16.—Pig iron demand has suddenly broadened out. Much larger tonnages have been bought and are under negotiation than have been in the market for many months. What is even more significant, extended deliveries are asked for, in some instances through the entire first half of 1931. Sales in this district total 11,000 tons, and fully that amount is pending, although details regarding inquiries are closely guarded.

The General Electric Co. has closed for 3750 tons for various plants, with deliveries extending into the first half. The Worthington Pump & Machinery Corp. is inquiring for 200 tons of foundry iron for Elmwood Place, Ohio, and contemplates entering the market for 1000 tons of foundry and 250 tons of Bessemer iron for its Buffalo plant. The Eastern Malleable Iron Co., Naugatuck, Conn., is asking for prices on 2500 tons of malleable. The New York Central Lines are in the market for 200 tons of various grades for fourth quarter delivery at Frankfort, N. Y., or Elkhart, Ind.

Prices are still highly competitive, with Buffalo, eastern Pennsylvania, Alabama and, to a certain extent, foreign irons all figuring in current business. The furnace at North Tonawanda, N. Y., was blown out Sept. 10.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	\$20.91
*Buff. No. 2, del'd east.	19.28
N. J. ....	19.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	\$18.89 to 19.39
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	18.89 to 19.89

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

\*Prices delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

### Warehouse Business

Seasonal improvement in buying from warehouse stocks has developed, but individual orders are still rather small. Demand for black and galvanized sheets is fair, but prices are still subject to \$2 and \$3 a ton concessions.

### Reinforcing Bars

Lettings are in fair volume, although not very large individually. The largest new project is a ramp leading to the Fort Lee bridge from Riverside Drive, New York, which will require 800 tons. General contracts have been placed for the public projects in Bergen County, N. J., bringing them another step toward the award of the steel. Efforts to stabilize prices continue, although they have not yet matured. Meanwhile, warehouse prices on concrete bars range from 2.30c. to 2.50c. a lb., f.o.b. cars, New York, while 40, 50 and 60-ft. lengths for mill shipment are quoted by distributors at 1.75c. to 1.85c. a lb., Pittsburgh.

### Cast Iron Pipe

Operating rates of Northern foundries range up to 75 per cent of capacity, but in some cases producers are operating at less than 50 per cent. Prices, however, are being maintained with little fluctuation, ranging from \$36 to \$37 a ton, f.o.b. Northern foundry. The largest inquiry for pressure pipe in the market for some months is about 14,000 tons of 48-in. pipe for West Virginia, inquired for by the Federal Water Service Co., New York. Sellers expect only part to be placed this year.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, \$38.90 to \$39.90; 4-in. and 5-in., \$41.90 to \$42.90; 3-in., \$48.90 to \$49.90. Class A and gas pipe, \$3 extra.

### Finished Steel

Comparing the past week with the one before, steel buying in the New York district has made very little gain, but orders for the first half of September have been slightly larger than for the first or last half of August. There is a lack of indications, however, of any marked expansion in steel orders in the near future.

Prices show a degree of stability not noticeable for many months. A good many of the local sales offices have received instructions to make no further concessions, and, if this policy is adhered to, the end of the decline in prices may have been reached. Whether the mills will be able to ob-

tain higher prices during the remainder of this year will, of course, depend to a considerable extent on the volume of incoming business as well as on the attitude of the mills. There has been some further contracting for the fourth quarter in bars, shapes and plates at current prices, but the real test of the higher levels recently announced by most of the makers of sheets is still to come.

Structural steel awards in the New York district in August, at 61,689 tons, compared favorably with the July record of 62,103 tons, as reported by the Structural Steel Board of Trade of New York. In August, 1929, lettings were 74,566 tons. These figures do not include steel for subways, bridges and other similar work. The McClintic-Marshall Co. was low bidder on 16,000 tons of fabricated steel for a bridge over the Passaic and Hackensack Rivers, a part of the New Jersey State highway program.

### Coke

The market shows no change, with furnace grade ranging in price from \$2.50 to \$2.60 per net ton, Connells-ville. Foundry coke prices continue, as follows:

Special brands of beehive foundry coke, \$1.70 to \$4.85 a net ton, ovens, or \$8.41 to \$8.56 delivered to northern New Jersey, Jersey City and Newark, and \$9.29 to \$9.44 to New York and Brooklyn; by-product foundry coke, \$9 to \$9.40, Newark or Jersey City; \$10.06, New York or Brooklyn.

### Old Material

No. 1 heavy melting steel continues to be the only active grade of scrap. An eastern Pennsylvania consumer has closed on 10,000 to 15,000 tons at \$13 a ton, delivered, which was the price paid by the same consumer on a similar purchase about a month ago. Other grades are unchanged, but show firmness.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel..	\$9.00 to \$10.50
Heavy melting steel (yard)	5.75 to 6.25
No. 1 hvy. breakable cast..	8.00 to 9.00
Stove plate (steel works)..	6.00 to 6.25
Locomotive grate bars....	6.00 to 6.50
Machine shop turnings....	5.00 to 5.25
Short shoveling turnings..	5.00 to 5.50
Cast borings (blast fur. or steel works) .....	4.50 to 5.00
Mixed borings and turnings .....	4.50 to 5.00
Steel car axles.....	17.00
Iron car axles.....	19.00 to 19.50
Iron and steel pipe (1 in. dia., not under 2 ft. long)	7.50 to 8.00
Forge fire .....	7.50
No. 1 railroad wrought....	9.75
No. 1 yard wrought, long..	8.75
Rails for rolling.....	9.50 to 10.00
Stove plate (foundry)....	7.00
Malleable cast (railroad)..	10.50 to 11.00
Cast borings (chemical)...	8.50 to 9.00

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	\$14.00
No. 1 hvy. cast (columns, bldg. materials, etc.) ; cupola size.....	12.00
No. 2 cast (radiators, cast boilers, etc.) .....	11.50

### Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes.....	3.10c.
Soft steel bars, small shapes.....	3.10c.
Iron bars .....	3.24c.
Iron bars, Swed. charcoal.....	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons.....	3.40c.
Flats and squares.....	3.90c.
Cold-roll. strip, soft and quarter	
hard .....	4.95c.
Hoops .....	3.75c.
Bands .....	3.40c.
Blue ann'd sheets (No. 10).....	3.25c. to 3.40c.
Black sheets (No. 24*).....	3.65c. to 3.90c.
Galvanized sheets (No. 24*).....	4.25c.
Long terne sheets (No. 24).....	5.80c.
Standard tool steel.....	12.00c.
Wire, black annealed.....	4.50c.
Wire, galv. annealed.....	5.15c.
Tire steel, ½ x ½ in. and larger..	3.40c.
Smooth finish, 1 to 2 ½ x ½ in. and larger .....	3.75c.
Open-hearth spring steel, bases,	
4.50c. to 7.00c.	

\*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller.....	.65
1 x 30 in. and smaller.....	.65
Carriage bolts, cut thread:	
¾ x 6 in. and smaller.....	.65
¾ x 20 in. and smaller.....	.65
Boiler Tubes:	Per 100 Ft.
Lap welded, 2-in.....	\$19.00
Seamless steel, 2-in.....	20.25
Charcoal iron, 2-in.....	26.25
Charcoal iron, 4-in.....	67.00
Tin Plate (14 x 20 in.)	
Prime	Seconds
Coke, 100 lb. base box... \$6.45	\$6.20
Charcoal, per Box—	A AAA
IC .....	\$9.70 \$12.10
IX .....	12.00 14.25
IXX .....	13.90 16.00



# PHILADELPHIA

Shapes Advanced \$2 a Ton—Volume of Buying Unchanged

PHILADELPHIA, Sept. 16.—Steel mill operations continue at about 50 per cent of capacity in the rolling departments and at a lower rate in production of ingots. Continued reduction of ingot stocks by certain mills has brought reserve supplies to a low level and the trend of open-hearth operation is expected to be upward, despite lack of definite improvement in business. Eastern shape mills have advanced the minimum price \$2 a ton, but the new quotation has not yet been tested. Plate mills are endeavoring to maintain 1.70c. a lb., Coatesville, Pa., as a minimum. Steel consumers in this district are operating better in many cases, but the improvement in business is generally among producers of materials for the building trades.

## Pig Iron

Inquiries for foundry iron are more numerous, but the total tonnage in the market is still small. Eastern Pennsylvania furnaces continue to quote \$18.50 a ton, base, on most current business, but this is still occasionally shaded about 50c. a ton to meet competition from Birmingham iron. Southern sellers, however, are not pressing for heavy-tonnage orders in this district as vigorously as a few months ago, although quotations continue at \$12 to \$12.50 a ton, Birmingham, \$17 to \$17.50 a ton, on cars Philadelphia. The New York Central Railroad is inquiring for 175 tons of iron, of which 100 tons is foundry grade, 50 tons Bessemer malleable and 25 tons silvery.

### Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	\$19.26 to \$19.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	19.76 to 20.26
East. Pa. No. 1X, 2.25 to 2.75 sil.	20.26 to 20.76
Basic (del'd east. Pa.)	18.25 to 18.50
Malleable	21.25
Stand. low phos. (f.o.b. east. Pa. furnace)	24.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.00 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	22.29
Va. No. 2X, 2.25 to 2.75 sil.	22.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

## Steel Bars

Plain steel bars are being quoted at 1.65c. a lb., Pittsburgh, or 1.94c., delivered Philadelphia, in an effort to establish the market at \$1 a ton higher level than has recently obtained. Billet steel reinforcing bars range from 1.75c. to 1.85c., Pittsburgh, or 2.04c. to 2.14c., Philadelphia, and rail steel bars are 1.55c. to 1.65c., Franklin, Pa., or 1.84c. to 1.94c., Philadelphia.

## Shapes

Eastern Pennsylvania mills have advanced their quotation on shapes

\$2 a ton to 1.70c. a lb., f.o.b. nearest mill to consumer, or 1.76c., Philadelphia. As the increase was effective Sept. 15, the new price level has not yet been subjected to a test, especially as outstanding quotations at the former level of 1.60c. to 1.65c. f.o.b. mill, or 1.66c. to 1.71c., Philadelphia, have not been withdrawn.

## Plates

Mills are quoting 1.70c. a lb., Coatesville, Pa., or 1.80½c., delivered Philadelphia, on orders for prompt shipment. The volume of business from plate consumers has not increased much in total tonnage, although inquiry is slightly more active than a few weeks ago.

## Sheets

Although many local consumers of sheets are operating at slightly increased rates, their requirements continue small. Demand for galvanized sheets is especially light, consumers evidently having temporarily covered requirements prior to stabilization of the galvanized quotation at 3.10c. a lb., Pittsburgh, or 3.39c., Philadelphia. Occasional concessions of \$1 a ton have recently appeared when desirable tonnages of galvanized sheets were offered. Black sheets are fairly firm at 2.45c., Pittsburgh, or 2.74c., delivered Philadelphia. Blue annealed sheets, No. 13 gage, are quoted at 2.15c., Pittsburgh, or 2.44c., Philadelphia, and blue annealed plates, No. 10 gage, at 2c., Pittsburgh, or 2.29c., Philadelphia.

## Imports

In the week ended Sept. 13, 6700 tons of iron ore arrived at this port from Algeria and 810 tons of chrome ore was received from Greece. Pig iron arrivals totaled 3424 tons, of which 1523 tons came from the United Kingdom, 1801 tons from British India and 100 tons from the Netherlands. Steel imports consisted

of 203 tons of structural shapes from Germany and 119 tons from Belgium.

## Old Material

About 10,000 tons of No. 1 heavy melting steel has been purchased at \$13 a ton, delivered, by an eastern Pennsylvania consumer. Other grades of scrap are showing greater price firmness, with holders in many cases awaiting better prices. Brokers are filling contracts with eastern Pennsylvania mills, but report no surplus of supplies available at present quotations.

### Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	\$13.00
No. 2 heavy melting steel	\$10.50 to 11.00
Heavy melting steel (yard)	10.00
No. 1 railroad wrought	14.75 to 15.00
Bundled sheets (for steel works)	9.50
Hydraulic compressed, new	11.00 to 11.50
Hydraulic compressed, old	9.50
Machine shop turnings (for steel works)	9.00
Heavy axle turnings (or equiv.)	11.50 to 12.00
Cast borings (for steel works and roll. mill)	8.75 to 9.00
Heavy breakable cast (for steel works)	11.50 to 12.50
Railroad grate bars	10.00
Stove plate (for steel works)	10.00
No. 1 low phos., hvy., 0.04% and under	20.00
Couplers and knuckles	17.50 to 18.00
Rolled steel wheels	17.50 to 18.00
No. 1 blast f'nace scrap	8.00 to 8.50
Wrot. iron and soft steel pipes and tubes (new specific.)	12.00 to 12.50
Shafting	18.00 to 18.50
Steel axles	21.00 to 21.50
No. 1 forge fire	11.50 to 12.00
Cast iron carwheels	15.00
No. 1 cast	13.00 to 13.50
Cast borings (for chem. plant)	14.00 to 14.50
Steel rails for rolling	13.50 to 14.00

## Distribution Reports Out on Ammunition, Motorcycles

WASHINGTON, Sept. 16.—Of the \$43,782,000 worth of commodities sold by the 20 establishments in the United States engaged primarily in the production of ammunition and related products last year, \$33,802,000 worth, or 81.3 per cent, was marketed through wholesale houses not connected in a financial way with the manufacturing plants. This was pointed out by Edward R. Dewey, chief, Industrial Goods Sections, Census of Distribution. The distribution report on the ammunition industry and one on the motorcycle and bicycle industry are the first ever issued by the Government.

The two reports, released yesterday, mark the inauguration of distribution reports to be issued for all industries of the country. Issuance of distribution reports by establishments for cities of 10,000 and over will begin on Sept. 22.

The report on motor cycles and bicycles shows that establishments engaged primarily in these lines in 1929 sold 48.9 per cent of the total of \$23,579,000 through retail stores.

## Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.60c.
Structural shapes	2.60c.
Soft steel bars, small shapes, iron bars (except bands)	2.70c.
Reinforc. steel bars, sq., twisted and deform.	2.60c. to 2.70c.
Cold-fin. steel, rounds and hex.	3.40c.
Cold-fin. steel, sq. and flats	3.90c.
Steel hoops	3.25c.
Steel bands, No. 12 to ¾-in. inclus.	3.00c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.70c.
†Galvanized sheets (No. 24)	4.25c.
Light plates, blue annealed (No. 10)	3.15c.
Blue ann'l'd sheets (No. 13)	3.30c.
Diam. pat. floor plates, ¼-in.	5.30c.
Swedish iron bars	6.60c.

\*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.

†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.



## CINCINNATI Pig Iron Market Lapses Into Dullness—Sheet Demand Improves

CINCINNATI, Sept. 16.—After the spurt of a week ago, activity in pig iron in this district has subsided. Foundries report that business is dull, and the melt accordingly is low. Sales in the past week were about 1450 tons, of which 400 tons went to Southern furnaces. A southern Ohio consumer took 100 tons of Northern foundry iron, and a central Indiana buyer placed an order for 200 tons of Southern foundry. This Southern iron brought about \$12, base Birmingham, which is the usual quotation in this district. Prices are firm on base grade, but furnaces are showing a tendency to waive silicon differentials on iron above the base grade.

Prices per gross ton, deliv'd Cincinnati:  
So. Ohio fdy., sil. 1.75 to 2.25 ..... \$20.89 to \$21.39  
Ala. fdy., sil. 1.75 to 2.25 ..... 15.69 to 16.69  
Ala. fdy., sil. 2.25 to 2.75 ..... 16.19 to 17.19  
Tenn. fdy., sil. 1.75 to 2.25 ..... 15.69 to 16.69  
S'th'n Ohio silvery, 8 per cent ..... 24.39

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

### Finished Steel

Demand for sheets has increased, but this may be only a slight flurry rather than a definite start of the long awaited uptrend. The orders were well distributed as to sheet consuming industries. An interesting feature was a slight increase in automotive buying. Mill operators also report fair activity in the radio industry, but a tapering in the road construction field.

### Old Material

With some of the district mills sus-

### Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
New billet reinfoc. bars.....	3.15c.
Rail steel reinfoc. bars.....	3.00c.
Hoops.....	3.90c.
Bands.....	3.35c.
Cold-fin. rounds and hex.....	3.80c.
Squares.....	4.30c.
Black sheets (No. 24).....	4.05c.
Galvanized sheets (No. 24).....	4.90c.
Blue ann'd sheets (No. 10).....	3.45c.
Structural rivets.....	4.20c.
Small rivets.....	.60 per cent off list
No. 9 ann'd wire, per 100 lb.....	\$3.00
Com. wire nails, base per keg (25 kegs or more).....	2.95
Cement c'd nails, base 100 lb. keg.....	2.95
Chain, per 100 lb.....	10.25
Net per 100 Ft.	
Lap-welded steel boiler tubes, 2-in.....	\$16.50
4-in.....	34.50
Seamless steel boiler tubes, 2-in.....	17.50
4-in.....	36.00

pending shipments of scrap on contracts, dealers are following the market cautiously. Prices generally are firm in the absence of any definite test.

### Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$11.25 to \$11.75
Scrap rails for melting.....	12.00 to 12.50
Loose sheet clippings.....	7.75 to 8.25
Bundled sheets.....	9.75 to 10.25
Cast iron borings.....	6.50 to 7.00
Machine shop turnings.....	6.00 to 6.50
No. 1 busheling.....	9.25 to 9.75
No. 2 busheling.....	6.00 to 6.50
Rails for rolling.....	13.00 to 13.50
No. 1 locomotive tires.....	13.25 to 13.75
No. 2 railroad wrought.....	11.25 to 11.75
Short rails.....	16.00 to 16.50
Cast iron carwheels.....	12.00 to 12.50
No. 1 machinery cast.....	14.50 to 15.00
No. 1 railroad cast.....	12.50 to 13.00
Burnt cast.....	7.25 to 7.75
Stove plate.....	7.25 to 7.75
Brake shoes.....	7.25 to 7.75
Agricultural malleable.....	12.50 to 13.00
Railroad malleable.....	13.50 to 14.00

## BIRMINGHAM Steel Sales Slightly Above Those of August—Pig Iron Dull

BIRMINGHAM, Sept. 16.—Pig iron sales recently have been limited to September delivery, but furnace interests are expected to open fourth quarter books at any time, probably at the present base price of \$14. Melters are still ordering iron only as needed, and it is rare that an open inquiry is issued. They have been carrying light stocks for some time, and there are no indications of an early change from this policy. Shipments showed improvement last week and in two instances they are reported as above the August average. A further gain is needed to make shipments equal the output. The Gulf States Steel Co. has changed its Alabama City furnace from basic to foundry iron. Out of the 13 active furnaces, 10 are on foundry iron, two on basic and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.....	\$14.00
No. 1 fdy., 2.25 to 2.75 sil.....	14.50
Basic.....	14.00

### Finished Steel

Sales last week showed little change from those of the preceding week, still running a shade higher than the August average. A slight but perceptible improvement is reported in the general tone of the market by two of the larger companies. Plates, light shapes and bars continue to lead the demand. Quotations are without change, the tendency being toward more firmness.

The total of active open-hearths dropped back again last week to 11, when the Tennessee company took off two at Ensley, leaving four of nine active at these operations. Four of eight are in operation at Fairfield, and the Gulf States Steel Co. continues to work three of six at Alabama City.

Interest in structural steel circles last week centered in 1850 tons up for awards at New Orleans, La. The Lukens Steel Co. was low bidder on 1100 tons for the Mandeville Street wharf and the Virginia Bridge & Iron

Co. was low on 750 tons for the Bienville Street wharf. Fabricators report pending tonnage light and new projects exceedingly slow to develop. Reinforcing bar manufacturers are finding demand weak and are moving only a few small tonnages.

### Cast Iron Pipe

Reluctance of buyers to close contracts on tonnages for which bids have been opened still holds back the market. Bids have been opened and awards are pending on 130,000 ft. of 8-in. pipe for Detroit. Greenville, Ala., is yet to announce awards on 200 tons and Johnson City, Tenn., on 600 tons. Morgan City, La., will open bids today on 8700 ft. of 10-in. pipe and 1500 ft. of 6-in. pipe. West Monroe, La., has opened bids on 8000 ft. of 6 to 10-in. pipe. Plants here expect to share in awards pending at San Francisco and Los Angeles. The National Cast Iron Pipe Co. has closed on 800 tons for Lake Falls, Mont., and the United States Pipe & Foundry Co. has received a contract for a round tonnage at Spartanburg, S. C. Plants are endeavoring to confine yard stocks to a minimum of standard sizes only. Less pressure pipe is reported on makers' yards than at any other time in the past year or longer. Prices hold at \$37 to \$38 a ton, Birmingham.

### Old Material

A few small spot tonnages make up the sales, and the movement of scrap on old orders is confined to light specifications of steel mills. Dealers are taking in but little scrap from the scanty offerings. Prices are unchanged.

Prices per gross ton deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$12.00
Scrap steel rails.....	\$12.50 to 13.00
Short shoveling turnings.....	9.00
Cast iron borings.....	9.00
Stove plate.....	11.50 to 12.00
Steel axles.....	20.00
Iron axles.....	23.00
No. 1 railroad wrought.....	10.00 to 10.50
Rails for rolling.....	14.50
No. 1 cast.....	13.00
Tramcar wheels.....	12.50
Cast iron carwheels.....	13.00 to 13.50
Cast iron borings, chem.....	13.50 to 14.00

## Blast Furnace Scrap Is Weaker at Detroit

DETROIT, Sept. 16.—Pending a revival of buying on the part of consumers, the market is drifting. Open-hearth grades are firm in the face of a lack of interest among steel mills, but blast furnace items have shown further weakness. However, in the absence of sizable transactions, prices are largely nominal. While dealers do not expect lower prices neither do they look for much, if any, gain in the near future.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel.....	\$11.25 to \$11.75
Borings and short turnings.....	5.75 to 6.25
Long turnings.....	5.75 to 6.25
No. 1 machinery cast.....	11.00 to 11.50
Automotive cast.....	12.25 to 12.75
Hydraul. comp. sheets.....	11.25 to 11.75
Stove plate.....	9.00 to 9.50
New No. 1 busheling.....	9.50 to 10.00
Old No. 2 busheling.....	5.50 to 6.00
Sheet clippings.....	8.00 to 8.50
Flashings.....	10.00 to 10.50

# BOSTON Slight Improvement in Pig Iron Sales, but Melt Has Not Increased Much

BOSTON, Sept. 16.—A slight improvement in pig iron sales occurred the past week without much increase in the foundry melt. Buying is credited to a belief that prices are at rock bottom. This week, however, the market will have its first real test in some time on an inquiry for 1100 tons of No. 2X and No. 1X from the Universal Winding Co., Providence, R. I. The past week's sales totaled about 3000 tons, against less than 1500 tons in the previous week, the increase being largely due to buying by the General Electric Co., which is melting three or four days a week at its Lynn, Mass., plant. It is reported that slightly less than the equivalent of \$16 a ton for No. 2X iron at Buffalo was accepted by one furnace the past week. Buffalo furnaces, however, are holding at \$16 a ton, furnace, for No. 2 plain and No. 2X, and at \$16.50 for No. 1X.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25...	\$20.28
†Buffalo, sil. 2.25 to 2.75...	\$20.28 to 20.78
*Buffalo, sil. 1.75 to 2.25...	20.91
*Buffalo, sil. 2.25 to 2.75...	20.91 to 21.41
Va., sil. 1.75 to 2.25...	25.21
Va., sil. 2.25 to 2.75...	25.71
*Ala., sil. 1.75 to 2.25...	22.61
*Ala., sil. 2.25 to 2.75...	23.11
†Ala., sil. 1.75 to 2.25...	18.75
†Ala., sil. 2.25 to 2.75...	19.25

Freight rates: \$4.91 all rail and \$4.28 rail and water from Buffalo; \$5.21 all rail from Virginia; \$9.61 all rail from Alabama and \$5.75 rail and water from Alabama to New England seaboard.

\*All rail rate.

†Rail and water rate.

## Cast Iron Pipe

The expected fall buying movement is slow in getting under way. Current buying for the most part is in car lots. The Donaldson Iron Co. has been awarded 100 tons of 6-in. pipe by Hillsboro, N. H., and a round tonnage of 12, 24, 30, 36 and 48-in. pipe by the State of Massachusetts. The company's bid for the Massachusetts business was \$41.40 a ton, delivered,

less 2 per cent discount. The next lowest bid was \$41 a ton net made by the Warren Foundry & Pipe Co. Worcester, Mass., is sounding out the market on about 4500 tons of 36-in. pipe for a Holden, Mass., project. Prices on Class B pipe range from \$35 to \$37 a ton, on cars shipping point. A \$3 differential is asked on Class A and gas pipe.

## Reinforcing Bars

No round tonnages were placed the past week, business being confined to scattered small lots. Prices are steady and unchanged as follows: Billet steel bars, one to 5-ton lots, 3.15c. a lb., base, from stock; 6 to 99 tons, 2.65c.; bars, one to 5 ton lots, 3.15c. a lb., 100 tons and larger lots, 2.55c. Rail steel bars, 2.26½c. a lb., delivered common Boston freight rate points.

## Structural Steel

Lettings and prospects slumped the past week, awards dropping to less than 1000 tons, while prospects, though fairly numerous, are small. Bids will be closed Sept. 23 on a Boston & Maine Railroad bridge at Tyngsboro, Mass.

## Warehouse Business

Prices on barbed wire, smooth fence wire and galvanized staples have been revised downward 5c. a 100 lb. The reduction follows one of the same amount on wire nails the previous week.

## Old Material

Owners of scrap are still holding out for higher prices, consequently the movement of material out of New

England is restricted. Prices on No. 1 heavy melting steel range from \$9 to \$9.50 a ton, on cars shipping point, with most sales at \$9.25 or \$9.50. One small sale is reported at \$10 a ton. A Worcester, Mass., mill is taking some long bundled skeleton, for which brokers are paying \$6 to \$6.25 a ton on cars, but for Pittsburgh district consumption the price is generally \$7.25 to \$7.75. Chemical borings are in excellent demand and short supply; consequently prices for them are strong, and a somewhat better feeling is also noted in the market for pipe. Mills will not pay more than \$13 to \$14 a ton delivered for No. 1 railroad wrought, which brings the prices on cars here to \$8.25 or \$8.50. A Massachusetts brake shoe manufacturer is taking stove plate at \$8 a ton, delivered. Continued buying of machinery cast for Pennsylvania consumption has raised the delivered New England price a little.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel...	\$9.00 to \$9.50
Scrap T rails...	8.50 to 9.25
Scrap girder rails...	7.50 to 8.25
No. 1 railroad wrought...	8.00 to 8.50
Machine shop turnings...	4.00 to 4.25
Cast iron borings (steel works and rolling mill)	4.00 to 4.25
Bundled skeleton, long...	6.10 to 6.50
Forge flashings...	7.25 to 7.75
Blast furnace borings and turnings...	3.10 to 3.60
Forge scrap...	6.10 to 6.50
Shafting...	13.50 to 14.00
Steel car axles...	15.50 to 17.00
Wrought pipe, 1 in. in diameter (over 2 ft. long)	7.25 to 7.60
Rails for rolling...	10.00 to 10.25
Cast iron borings, chemical	9.50 to 10.00

Prices per gross ton deliv'd consumers' yards:

Textile cast...	\$11.00 to \$11.50
No. 1 machinery cast...	13.50 to 14.00
No. 2 machinery cast...	11.50 to 12.00

Buying prices per gross ton, f.o.b. Boston

Railroad malleable... 14.00 to 14.50

# BUFFALO Pig Iron Inquiry Gains Slightly—Steel Mill Operations Unchanged

BUFFALO, Sept. 16.—The pig iron market shows a moderate improvement in inquiry this week. Shipments show a slight decline. The General Electric Co. is inquiring for 2000 to 3000 tons of foundry and an Eastern malleable melter is in the market for 1000 tons. There are four or five other inquiries which run 300 to 400 tons each. Sales during the week are estimated at about 3500 tons. The Buffalo makers do not look for lower prices, believing that the market is on the bottom. Canal rates are very firm, due to a heavy grain movement, and chances of a reduction in water tariffs are slim.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25...	\$18.50
No. 2X fdy., sil. 2.25 to 2.75...	19.00
No. 1 fdy., sil. 2.75 to 3.25...	20.00
Malleable, sil. up to 2.25...	19.00
Basic...	17.50
Lake Superior charcoal...	27.28

## Finished Steel

Operations of Buffalo steel mills remain about the same. The Lacka-

wanna plant of the Bethlehem Steel Co. is operating 11 of 24 open-hearths. Several of the mills are down, and others are on single turn. The Donner plant of the Republic Steel Corp. is operating four open-hearths of nine, while the Wickwire Spencer Steel Corp. continues to run approxi-

## Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c
Structural shapes—	
Angles and beams...	3.365c
Tees	3.365c
Zees	3.365c
Soft steel bars, small shapes...	3.265c
Flats, hot-rolled	4.15c
Reinforcing bars	3.265c to 3.54c
Iron bars—	
Refined	3.265c
Best refined	4.60c
Norway rounds	6.60c
Norway squares and flats...	7.10c
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex.	3.50c. to 5.55c.
Squares and flats...	4.00c. to 7.05c.
Toe calk steel...	6.00c.
Rivets, structural or boiler	4.50c.
Per Cent Off List	
Machine bolts	.60 and .5
Carriage bolts	.60 and .5
Lag screws	.60 and .5
Hot-pressed nuts	.60 and .5
Cold-punched nuts	.60 and .5
Stove bolts	.70 and .5

## Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes...	3.25c.
Soft steel bars...	3.15c.
Reinforcing bars	2.95c.
Cold-fin. flats and sq.	3.65c.
Rounds and hex.	3.15c.
Cold-rolled strip steel...	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.60c.
Bands	3.50c.
Hoops	3.90c.
Blue ann'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg...	\$3.20
Black wire, base per 100 lb.	3.50

mately full. The Seneca Iron & Steel Co. is operating at 45 to 50 per cent.

## Old Material

The market during the past week was devoid of important transactions. Prices are nominal.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel...	\$12.75 to \$13.25
Nb. 2 heavy melting scrap...	11.00 to 12.00
Scrap rails .....	12.00 to 12.50
Hydraulic comp. sheets...	11.25 to 12.25
Hand bundled sheets.....	9.00 to 9.50
Drop forge flashings.....	11.00 to 11.50
No. 1 busheling.....	11.25 to 12.50
Hvy. steel axle turnings...	11.00 to 11.50
Machine shop turnings.....	6.00 to 7.00
No. 1 railroad wrought...	10.00 to 10.50
Acid Open-Hearth Grades:	
Knuckles and couplers.....	15.00 to 15.50
Coil and leaf springs.....	15.00 to 15.50

Rolled steel wheels.....	15.00 to 15.50
Low phos. billet and bloom ends .....	16.50 to 17.00
Electric Furnace Grades:	
Short shov. steel turnings..	9.75 to 10.25
Blast Furnace Grades:	
Short mixed borings and turnings .....	7.50 to 8.00
Cast iron borings.....	7.50 to 8.00
No. 2 busheling.....	7.00
Rolling Mill Grades:	
Steel car axles.....	16.00 to 16.50
Iron axles .....	19.00 to 19.50
Cupola Grades:	
No. 1 machinery cast.....	11.00 to 12.00
Stove plate .....	10.25 to 10.50
Locomotive grate bars....	8.25 to 9.25
Steel rails, 3 ft. and under	16.00 to 16.50
Cast iron carwheels.....	13.50 to 14.00
Malleable Grades:	
Industrial .....	14.25 to 15.25
Railroad .....	14.25 to 15.25
Agricultural .....	14.25 to 15.25
Special Grades:	
Chemical borings .....	11.50 to 12.00

no indications of an early resumption of buying, dealers are paying higher prices for some items in the belief that the market will strengthen when the mills start a buying movement. Some items are scarce, and there is especially keen competition among the dealers for railroad offerings. Rails for rolling and melting are especially scarce. There is said to be no distress material of any kind. Railroad lists: Chesapeake & Ohio, 3468 tons; New York Central, 2600 tons; Wabash, 2258 tons; Missouri-Kansas-Texas, 1500 tons; Louisville & Nashville, 1250 tons; Chicago, Rock Island & Pacific, 50 carloads; New York, Chicago & St. Louis, 40 carloads; Chicago, Milwaukee, St. Paul & Pacific, 16 carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

Selected heavy melting steel .....	\$11.50 to \$12.00
No. 1 heavy melting or shoveling steel .....	11.00 to 11.35
No. 2 heavy melting or shoveling steel .....	10.25 to 10.50
No. 1 locomotive tires....	13.25 to 13.75
Misc. stand-sec. rails including frogs, switches and guards, cut apart...	12.75 to 13.25
Railroad springs .....	14.00 to 14.50
Bundled sheets .....	7.00 to 7.50
No. 2 railroad wrought...	11.25 to 11.50
No. 1 busheling.....	8.00 to 8.50
Cast iron borings and shoveling turnings .....	6.00 to 6.50
Iron rails .....	10.00 to 11.00
Rails for rolling.....	13.50 to 14.00
Machine shop turnings....	4.50 to 5.00
Heavy turnings .....	9.25 to 9.75
Steel car axles.....	16.50 to 17.00
Iron car axles.....	21.00 to 21.50
Wrot. iron bars and trans.	14.00 to 14.50
No. 1 railroad wrought...	9.00 to 9.50
Steel rails, less than 3 ft..	14.50 to 15.00
Steel angle bars.....	12.50 to 13.00
Cast iron carwheels.....	12.00 to 12.50
No. 1 machinery cast.....	11.00 to 11.50
Railroad malleable .....	11.50 to 12.00
No. 1 railroad cast.....	11.00 to 11.50
Stove plate .....	9.00 to 9.50
Relay. rails, 60 lb. and under .....	20.50 to 23.50
Relay. rails, 70 lb. and over .....	26.50 to 29.00
Agricult. malleable .....	10.00 to 10.50

## ST. LOUIS Pig Iron Inquiry Improves—Steel Demand Also Better

ST. LOUIS, Sept. 16.—A better feeling is reported to exist in the pig iron market, as evidenced by the receipt of more inquiries than have been issued in some time; notable among these is one for 2000 tons of foundry iron for an Illinois tractor manufacturer. Sales, however, continue light for both Northern and Southern makers, with prices steady. The melt in the district continues light. Malleable foundries are experiencing an increase in orders from the automobile manufacturers, but shipments so far have been mostly from stock. Business with the steel plants is quiet.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25,	
f.o.b. Granite City, Ill., \$18.00 to \$18.50	
Malleable, f.o.b. Granite City .....	18.00 to 18.50
N't'n No. 2 fdy., deliv'd St. Louis .....	19.66
Southern No. 2 fdy., deliv'd .....	16.42 to 16.92
Northern malleable, deliv'd .....	19.16 to 19.66
Northern basic, deliv'd....	19.16 to 19.66

Freight rates: 75c. (average) Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

## Finished Steel

A marked improvement in inquiries for plates, shapes, bars and sheets is reported here, with a slight increase

in business. The improvement is most noticeable in sheets, prices of which show a tendency toward firmness. The only railroad business pending is an inquiry from the Missouri-Kansas-Texas for steel with which to build 50 cabooses in its shops at Denison, Tex. Warehouse business continues to show the gains which marked the first week in September, although it is still behind the volume of a year ago. The only structural steel award of the week was 600 tons to the Mississippi Valley Structural Steel Co. for a warehouse in East St. Louis, Ill.

## Old Material

Although consumers in the St. Louis district are buying very little and give

## CANADA Tariff Protection for Dominion Steel Industry Expected—Business Slow

TORONTO, Sept. 16.—It appears that early changes will be made in the tariff to furnish more protection for iron and steel lines produced in Canada that come under competition from the United States. Officials of steel companies do not believe that higher duties will necessarily mean increased prices for commodities in this country, but point out that a tariff to reduce imports of American products will in turn be reflected in increased production and operations at the Canadian steel plants. It is now believed that the government will take action to increase the tariff on a number of steel commodities during the present session.

The government has announced plans for relieving the unemployment situation. Twenty million dollars will be available, but no definite program has been announced for its disposal. It is expected, however, that more extensive buying will be undertaken for railway construction, including the purchase of rails, track supplies and

rolling stock. Building and bridge construction programs have also been announced, and some contracts will shortly be awarded.

As an indication of the better feeling prevailing with regard to future business is the announcement that the Massey-Harris Co. will reopen its local plant. According to G. A. Valentine, vice-president, the castings and forgings departments will start up next week, after being closed down for several weeks; finishing and assembly departments will follow two weeks later.

The steel industry has shown little indication of stepping up production. The Hamilton, Ont., and Sydney, N. S., mills are running at slightly better than 65 per cent capacity, while the Sault Ste. Marie plant is virtually closed down.

## Pig Iron

Melters are beginning to show more interest in the market. Somewhat restricted fourth quarter booking has

## Warehouse Prices, f.o.b. St. Louis

Base per Lb.	
Plates and struc. shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
Cold-fin. rounds, shafting, screw stock .....	3.60c.
Black sheets (No. 24).....	4.25c.
Galv. sheets (No. 24).....	4.85c.
Blue ann'd sheets (No. 10).....	3.45c.
Black corrug. sheets (No. 24).....	4.30c.
Galv. corrug. sheets.....	4.90c.
Structural rivets .....	4.15c.
Boiler rivets .....	4.15c.
Per Cent Off List	
Tank rivets, 3/4-in. and smaller, 100 lb. or more .....	65
Less than 100 lb.....	60
Machine bolts .....	60
Carriage bolts .....	60
Lag screws .....	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50



been done, and inquiries have appeared which indicate that a number of consumers will make known their requirements before the end of the month.

#### Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75.....	\$22.60
No. 2 fdy., sil. 1.75 to 2.25.....	22.10
Malleable .....	22.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75.....	\$24.00
No. 2 fdy., sil. 1.75 to 2.25.....	23.50
Malleable .....	24.00
Basic .....	22.50

### Structural Steel

While sales were mostly in small tonnage lots, several orders for substantial tonnages are pending in the Eastern districts and Quebec. The Canadian National Railways have called for bids for two bridges, for which about 7000 tons of steel will be required.

### Old Material

Improved buying has featured business in this market. While orders were confined to small lots, they were more numerous, and there is some indication of forward delivery contracting. Prices are unchanged.

#### Dealers' buying prices for old material: Per Gross Ton

	Toronto	Montreal
Heavy melting steel.....	\$9.00	\$8.00
Rails, scrap .....	10.00	8.00
No. 1 wrought.....	9.00	11.00
Machine shop turnings.....	6.00	5.00
Boiler plate .....	7.00	6.50
Heavy axle turnings.....	7.00	6.00
Cast borings .....	6.50	5.00
Steel borings .....	6.50	6.00
Wrought pipe .....	4.00	4.00
Steel axles .....	10.00	13.00
Axles, wrought iron.....	12.00	15.00
No. 1 machinery cast.....	12.00	12.00
Stove plate .....	10.00	10.00
Standard carwheels .....	10.50	10.50
Malleable .....	10.00	10.00
Per Net Ton		
No. 1 mach'y cast.....	11.00	....
Stove plate .....	9.00	....
Standard carwheels .....	10.00	....
Malleable scrap .....	9.00	....

## PACIFIC COAST

**SAN FRANCISCO, Sept. 13.—(By Air Mail)**—Although awards were not especially heavy this week, a fair-sized volume of pending projects points to increased demand during the next three months. Important lettings included 1000 tons of structural shapes for a bridge at Lillooet, B. C., for the Pacific Great Eastern Railroad, placed with the Dominion Bridge Co., and 277 tons of reinforcing steel bars for a bridge over the San Gabriel River in California. Little change is noted in the price structure. Quotations continue to hold fairly well at the established levels.

#### Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes.....	3.40c.
Soft steel bars.....	3.40c.
Black sheets (No. 24).....	4.35c.
Blue ann'd sheets (No. 10).....	3.80c.
Galv. sheets (No. 24).....	5.00c.
Struc. rivets, ½-in. and larger.....	5.00c.
Com. wire nails, base per keg.....	\$3.35
Cement c't'd nails, 100 lb. keg.....	3.35

### Bars

Prices on out-of-stock reinforcing bars, both in the Los Angeles and San Francisco districts, continue unchanged and firm at 2.50c., base, on carload lots. Awards exceeded 900 tons. The Pacific Coast Steel Corporation secured 185 tons for a wharf in Oakland and W. C. Hauck & Co. took 120 tons for a school at San Jose, Cal. Only two new inquiries in excess of 100 tons were noted. Bids are being taken on 200 tons for a theater in San Francisco and bids will be opened on Sept. 22 for 138 tons for a storm drain in Los Angeles. Merchant bar steel continues to move in small lots only. Prices on this class of material appear firm at 2.35c., c.i.f.

### Larger Volume of Pending Building Projects

#### Pig iron prices per gross ton at San Francisco:

*Utah basic .....	\$22.00 to \$24.00
*Utah fdy., sil. 2.75 to 3.25 .....	22.00 to 24.00
**Indian fdy., sil. 2.75 to 3.25 .....	22.00 to 24.00

\*Delivered San Francisco.  
\*\*Duty paid, f.o.b. cars San Francisco.

### Plates

No award has yet been made on the 2000-ton pipe line at Anacortes, Wash. Awards of plates this week were confined to lots of less than 100 tons. Pasadena plans a water system requiring 56,000 ft. of 60-in. pipe. Longview, Wash., has plans under way for 6000 ft. of 20-in. pipe. The Howard Flat Irrigation District of Chelan County, Washington, is having plans prepared for five miles of 30-in. steel pipe and close to 32,000 ft. of 6 to 22-in. steel distributing pipe. Prices of plates continue to range from 2.15c. to 2.25c., c.i.f.

### Structural Steel

Fabricators of structural steel in the San Francisco district are keenly interested in the new Olympic Club building, bids on which are being taken. Close to 7500 tons is involved. The Pacific Iron & Steel Co. took 325 tons for a plant in Burbank, Cal., for the Hamilton Propeller Co. Other awards were confined to lots of less than 100 tons. The Union Bridge Co. secured the general contract for the Hoh River bridge in Washington, calling for 300 tons. Bids will be opened Sept. 22 on 205 tons for a bridge at Seligman, Ariz. Structural material quotations range from 2.15c. to 2.25c., c.i.f.

### Cast Iron Pipe

The only cast iron pipe award of importance went to the American Cast

Iron Pipe Co. and called for 104 tons of 4 and 6-in. Class 150 pipe for Whittier, Cal. Los Angeles opened bids on 525 tons of 24-in. Class B pipe and on 1577 tons of 8 and 12-in. Class 150 pipe. The only new inquiry of importance involves 2216 tons of 4 to 12-in. Class B pipe for Long Beach, Cal., bids on which will be opened Sept. 23.

## Youngstown

### Mills Operating at an Average of 58 Per Cent

**YOUNGSTOWN, Sept. 16.**—For the third week in September, the Valley iron and steel industry operates at a 58 per cent average, though producers generally report an improved tone in market conditions. Youngstown steel makers look for a higher market, but do not expect to benefit from improved prices until the first quarter of 1931. In the meantime, however, an effort will be made to strengthen the market on flat-rolled steels.

Another blast furnace is off the list, the Carnegie Steel Co. having banked one in its Ohio works group at Youngstown, leaving but two furnaces in this complement active.

There is some interruption in pipe departments because production is ahead of the construction crews in the field. This condition is responsible for moderation in the rate of output. The district average for steel pipe production this week is 60 per cent, with Republic Steel at 75 per cent.

Strip and tin mills are operating at 60 per cent, with independent steel bar capacity at 55 per cent.

### Withholds Issuance of Trade Practice Rules

**WASHINGTON, Sept. 16.**—The Federal Trade Commission is withholding the issuance of trade practice rules until Oct. 25, or later. This is in keeping with an agreement the commission made with the American Trade Association Executives, who will meet in Niagara Falls, Ont., Sept. 25-26, and discuss trade practice rules, and give particular attention to the commission's new policy of revising the rules. Industrial and business interests generally contend that the changed attitude of the commission, by which it hedges certain rules, especially those in group II, with legal provisions, has the effect of nullifying the purpose of the rules.

Darwin & Milner, Inc., Cleveland, American division of Darwin's Ltd., Kitzwilliam Works, Sheffield, England, has appointed Albert Goldman, 4421 North Ninth Street, Philadelphia, as eastern Pennsylvania and East Coast representative.

# ▲▲ Semi-Finished Steel, Raw Materials, Bolts and Rivets ▲▲

## Mill Prices of Semi-Finished Steel

Billets and Blooms		Sheet Bars		Skelp	
		(Open Hearth or Bessemer)		(F.o.b. Pittsburgh or Youngstown)	
		Per Gross Ton		Per Lb.	
Rerolling, 4-in. and under 10-in., Pitts-		Pittsburgh	\$31.00	Grooved	1.70c.
burgh	\$31.00	Youngstown	31.00	Universal	1.70c.
Rerolling, 4-in. and under 10-in., Youngs-		Cleveland	31.00	Sheared	1.70c.
town	31.00				
		Slabs		Wire Rods	
		(8 in. x 2 in. and under 10 in. x 10 in.)		(Common soft, base)	
		Per Gross Ton		Per Gross Ton	
Rerolling, 4-in. and under 10-in., Cleve-		Pittsburgh	\$31.00	Pittsburgh	\$36.00
land	31.00	Youngstown	31.00	Cleveland	36.00
Rerolling, 4-in. and under 10-in., Chicago	\$2.00	Cleveland	31.00	Chicago	37.00
Forging quality, Pittsburgh	36.00				

## Prices of Raw Material

Ores		Ferromanganese		Fluxes and Refractories	
				Fluorspar	
		Per Gross Ton		Per Net Ton	
Lake Superior Ores, Delivered Lower Lake Ports		Domestic, 80%, seaboard	\$94.00 to \$99.00	Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	\$18.00
		Foreign, 80%, Atlantic or Gulf port, duty paid	94.00 to 99.00	No. 2 lump, Illinois and Kentucky mines	20.00
				Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	\$18.00 to 18.50
				Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/2% silica, f.o.b. Illinois and Kentucky mines	32.50
		Spiegeleisen		Fire Clay Brick	
		Per Gross Ton		Per 1000 f.o.b. Works	
		Domestic, 19 to 21%	\$31.00 to \$33.00	High-Heat	Intermediate
		Domestic, 16 to 19%	29.00 to 32.00	Duty Brick	Heavy Duty Brick
		Electric Ferrosilicon		Pennsylvania	\$43.00 to \$46.00
		Per Gross Ton Delivered		Maryland	43.00 to 46.00
		50%	\$83.50	New Jersey	50.00 to 65.00
		75%	130.00	Ohio	43.00 to 46.00
		Per Gross Ton		Kentucky	43.00 to 46.00
		Furnace		Missouri	43.00 to 46.00
		10%	\$35.00	Illinois	43.00 to 46.00
		11%	37.00	Ground fire clay, per ton	7.00
		Bessemer Ferrosilicon			
		F.o.b. Jackson County, Ohio, Furnace		Silica Brick	
		Per Gross Ton		Per 1000 f.o.b. Works	
		10%	\$26.50	Pennsylvania	\$43.00
		11%	28.50	Chicago	52.00
		12%	30.50	Birmingham	50.00
		Silvery Iron		Silica clay, per ton	\$8.50 to 10.00
		F.o.b. Jackson County, Ohio, Furnace			
		Per Gross Ton		Magnesite Brick	
		6%	\$21.00	Per Net Ton	
		7%	21.50	Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
		8%	22.00	Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
		9%	22.50	Standard size	45.00
		10%	23.00		
				Chrome Brick	
				Per Net Ton	
				Standard size	\$45.00

## Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts		Bolts and Nuts		Small Rivets	
				(7/16-in. and smaller)	
		Per Cent Off List		Per Cent Off List	
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)		Semi-finished hexagon nuts	73	F.o.b. Pittsburgh	70, 10 and 5
		Semi-finished hexagon castellated nuts, S.A.E.	73	F.o.b. Cleveland	70, 10 and 5
		Stove bolts in packages, P'gh	80, 10, 10 and 5	F.o.b. Chicago	70, 10 and 5
		Stove bolts in packages, Chicago	80, 10, 10 and 5		
		Stove bolts in packages, Cleveland	80, 10, 10 and 5	Cap and Set Screws	
		Stove bolts in bulk, P'gh	80, 10, 10, 5 and 2 1/2	(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)	
		Stove bolts in bulk, Chicago	80, 10, 10, 5 and 2 1/2	Per Cent Off List	
		Stove bolts in bulk, Cleveland	80, 10, 10, 5 and 2 1/2	Milled cap screws	80, 10, 10 and 5
		Two bolts	60, 10 and 10	Milled standard set screws, case hardened	80 and 5
				Milled headless set screws, cut thread	75 and 10
		Discounts of 73 per cent off on bolts and nuts apply on carload business with jobbers and large consumers.		Upset hex. head cap screws, U.S.S. thread	85 and 10
		Large Rivets		Upset hex. cap screws, S.A.E. thread	80, 10 and 5
		(1/2-in. and larger)		Milled studs	70
		Base per 100 Lb.			
		F.o.b. Pittsburgh or Cleveland	\$2.75		
		F.o.b. Chicago	2.85		





# Fabricated Structural Steel

## Awards of 25,000 Tons and New Projects of 35,000 Tons Are Distributed Over South and West

**A**WARDS of fabricated steel totaled about 25,000 tons this week, or slightly more than in the previous week. Contracts were well distributed over the country, construction in the South contributing a substantial tonnage. Included were 3600 tons for two highway bridges in West Virginia, 5000 tons in a bridge over the Ohio River at Ashland, Ky., 2000 tons in an apartment house at Eighty-eighth Street and Central Park West, New York, and 1000 tons in an apartment building at Christopher and Bleecker Streets, New York. New projects totaling about 35,000 tons were considerably in excess of the previous week's total and included 6300 tons for a garage on West End Avenue, New York, 5000 tons in a viaduct for the Cincinnati Union Terminals Co. and 4500 tons in a viaduct for Milwaukee. Awards follow:

### North Atlantic States

MALDEN, MASS., 200 tons, hospital, to Boston Structural Steel Co., Inc.  
EVERETT, MASS., 106 tons, hospital, to Boston Structural Steel Co., Inc.  
BRISTOL, N. H., 300 tons, bridge, to Boston Bridge Works, Inc.  
BARTLETT, N. H., 100 tons, bridge to unnamed fabricator.  
STATE OF NEW YORK, 1020 tons, highway bridges; 600 tons to American Bridge Co., 420 tons to McClintic-Marshall Co.  
NEW YORK, 2000 tons, apartment building at Eighty-eighth Street and Central Park West, to Paterson Bridge Co.  
NEW YORK, 1000 tons, apartment building at Christopher and Bleecker Streets, to Dreier Iron Works.  
STATE OF NEW YORK, 180 tons, Green County highway bridge, to Penn Bridge Co.  
PENNSYLVANIA RAILROAD, 150 tons, concourse at terminal in New York, to Robinson Iron & Steel Co.

### The South

HUNTINGTON, W. VA., 1200 tons, building for West Virginia Rail Co., to Hiner Structural Steel Co.  
STATE OF WEST VIRGINIA, 3600 tons, two highway bridges over Kanawha River, to Independent Bridge Co.  
STATE OF KENTUCKY, 5000 tons, bridge across Ohio River at Ashland, to Mount Vernon Bridge Co.  
LOUISVILLE & NASHVILLE RAILROAD, 1200 tons, bridge No. 38 over Cumberland River, to American Bridge Co.  
TURNBULL, LA., 500 tons, Texas & Pacific bridge, to Virginia Bridge & Iron Co.

### Central States

CLEVELAND, 560 tons, New York Central Railroad warehouse, to Massillon Bridge & Structural Co.  
AKRON, OHIO, 100 tons, building for Telling Belle Vernon Co., to Berger Iron Works.  
BUFFINGTON, IND., 500 tons, Universal Atlas Cement Co., to American Bridge Co.  
WILMETTE, ILL., 550 tons, new Bahai Temple, to Worden-Allen Co.  
EAST ST. LOUIS, ILL., 600 tons, fertilizer warehouse for Barling Co., to Mississippi Valley Structural Steel Co.

### Western States

DENVER, 400 tons, high school, to E. Burkhardt & Sons, local.  
OMAHA, NEB., 225 tons, motor-bus garage, to Omaha Steel Co.  
UNION PACIFIC RAILROAD, 673 tons, bridge girders, to American Bridge Co.  
BURBANK, CAL., 325 tons, Hamilton Propeller Co. plant, to Pacific Iron & Steel Co.

### Canada

SCHUMACHER, ONT., 2000 tons, mill for McIntyre Porcupine Mines, Ltd., to Dominion Bridge Co.  
ST. JOHN, N. B., 1200 tons, hospital, to St. John Drydock & Shipbuilding Co.  
LILLOOET, B. C., 1000 tons, bridge for Pacific Great Eastern Railroad, to Dominion Bridge Co.

### STRUCTURAL PROJECTS PENDING

Inquiries for fabricated steel work include the following:

### North Atlantic States

NEW YORK, 2000 tons, United States Assay Office building at Old Slip and South and Front Streets; Great Lakes Contracting Co., Chicago, low bidder on general contract.  
NEW YORK, 200 tons, addition to school No. 11 in Richmond.  
NEW YORK, 100 tons, gymnasium building for Convent of Sacred Heart.  
NEW YORK, unstated tonnage, subway alterations and street widening, East 135th to 151st Street and Mott Avenue.  
NEW YORK, 6300 tons, garage for New York Central Railroad at Sixty-fourth Street and West End Avenue.  
NEW YORK, 1500 tons, apartment building, 227 East Fifty-seventh Street.  
NEW YORK, 1000 tons, apartment building at Eighty-sixth Street and Madison Avenue.  
NEW YORK, 1000 tons, building for Columbia University Medical School.  
GLENS FALLS, N. Y., 100 tons, bridge for Delaware & Hudson Railroad.  
STATE OF NEW JERSEY, 16,000 tons, for bridge over Passaic and Hackensack rivers as part of State highway program; McClintic-Marshall Co., low bidder.  
STATE OF MARYLAND, 200 tons, highway bridge.

### The South

BONCAR, W. VA., 600 tons, power station for Ford, Bacon & Davis.  
NEW ORLEANS, 1100 tons, Mandeville Street wharf; Lukens Steel Co., low bidder.  
NEW ORLEANS, 750 tons, Bienville Street wharf; Virginia Bridge & Iron Co., low bidder.

### Central States

ALGONQUIN AND COLMAR, ILL., 650 tons, highway bridges.  
CINCINNATI, 5000 tons, viaduct for Cincinnati Union Terminals Co.; bids close Oct. 20.  
MILWAUKEE, 4500 tons, new Thirty-fifth Street viaduct; bids about Oct. 15.  
ST. LOUIS, 500 tons, building for Globe-Democrat.

### Western States

OLYMPIA, WASH., 300 tons, Hoh River State bridge; general contract to Union Bridge Co.  
PHOENIX, ARIZ., 205 tons, State bridge at Saligman; bids Sept. 22.  
SAN FRANCISCO, 7500 tons, Olympic Club; bids being taken.

### Canada

ST. ROSE, QUE., 3000 tons, bridge to span Jesus River for Alphonse Belair, St. Therese, Que.

## Coming Meetings September

**National Machine Tool Builders' Association.** Sept. 22 and 23. Second cost conference, Hotel Clifton, Niagara Falls, Ont. Ernest F. DuBrul, 617 Vine Street, Cincinnati, general manager.

**American Society for Steel Treating.** Sept. 22 to 26. National metal congress and exposition, Stevens Hotel, Chicago. W. H. Eisenman, 7016 Euclid Avenue, Cleveland, secretary.

**American Society of Mechanical Engineers.** Sept. 22 to 24, Machine Shop Practice Division; Sept. 24 to 26, Iron and Steel Division, Stevens Hotel, Chicago. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

**American Institute of Mining and Metallurgical Engineers.** Sept. 22 to 26. Fall meeting of Institute of Metals Division and Iron and Steel Division, Stevens Hotel, Chicago. H. Foster Bain, 29 West Thirty-ninth Street, New York, secretary.

**American Welding Society.** Sept. 22 to 26. Fall meeting, Congress Hotel, Chicago. W. M. Spraragen, 29 West Thirty-ninth Street, New York, technical secretary.

**American Electrochemical Society.** Sept. 25 to 27. Fall meeting, Statler Hotel, Detroit. Colin G. Fink, Columbia University, New York, secretary.

**American Gear Manufacturers' Association.** Sept. 29 to Oct. 1. Fall meeting, Hotel Clifton, Niagara Falls, Ont. T. W. Owen, 3608 Euclid Avenue, Cleveland, secretary.

**National Safety Council.** Sept. 29 to Oct. 3. Nineteenth annual meeting, Fort Pitt and William Penn Hotels, Pittsburgh. Metals section Tuesday and Wednesday mornings and Thursday afternoon. W. H. Cameron, 108 East Ohio Street, Chicago, managing director.

## October

**Society of Automotive Engineers.** Oct. 7 and 8. Production meeting, Book-Cadillac Hotel, Detroit. R. S. Burnett, 29 West Thirty-ninth Street, New York, director, production activities.

**Gray Iron Institute.** Oct. 8. Annual meeting, Hotel Cleveland, Cleveland. Arthur J. Tuscany, Terminal Tower Building, Cleveland, secretary-manager.

**National Association of Farm Equipment Manufacturers.** Oct. 8 to 10, Congress Hotel, Chicago. H. J. Sameit, 608 South Dearborn Street, Chicago, secretary.

**American Drop Forging Institute.** Oct. 9 to 11. Fall meeting, Briarcliff Lodge, Briarcliff, N. Y. F. W. Sinram, Gears & Forgings, Inc., Cleveland, chairman convention committee.

# ▲▲▲ Non-Ferrous Metal Markets ▲▲▲

## Copper at 10.50c. — Tin Inactive—Lead Steady —Zinc Lower

NEW YORK, Sept. 16.

### Copper

Developments in this market have been numerous the last few days. First came the August statistics, which showed an increase of about 25,000 tons in stocks of refined metal, followed by a reduction in quotations and reports of still lower prices. The large increase in stocks was a severe blow, being much larger than expected, coming as it did in a market pretty well sold ahead. On Saturday, Sept. 13, electrolytic copper was available from custom smelters at 10.50c., delivered in the Connecticut Valley, and yesterday, Sept. 15, virtually all primary producers lowered their quotation to 10.75c. These levels are the lowest in about 30 years. Naturally, sales to domestic consumers are virtually nil. Yesterday Copper Exporters, Inc., lowered its quotation to foreign consumers to 11.05c., c.i.f. European ports, effective today. As a result, there were some purchases, the total for today being about 1400 tons, owing to foreign consumers being covered only partly for September and October. Sales to date abroad are about 32,000,000 lb.

The present situation as to prices is somewhat mixed, there being some talk of lower levels, 10c. having been mentioned. Should the red metal go as low as this, there are expectations that there might be fairly large purchases for investment because copper would be exceedingly cheap at that price. It is even suggested that custom smelters might purchase the metal as an investment. With domestic consumers well covered for a large part of the rest of the year, the future of the market is shrouded in uncertainty. There is the added danger of competition in the not distant future from metal refined in Canada by new refineries just starting up, so much so that there is talk of agitation for a duty on the metal. Lake copper is correspondingly inactive, at 10.75c. to 10.87½c., delivered.

### Tin

A little business has been done in the past week for both nearby and future delivery. Consumers were the buyers, dealers being virtually out of the market. A feature has been the small change in prices day by day. With spot Straits tin quoted today at 29.87½c., New York, the spread in quotations for the week has been within 20 points, an unusual occurrence. Prices in London today were close to those of a week ago, with

## THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Sept. 16	Sept. 15	Sept. 13	Sept. 12	Sept. 11	Sept. 10
Lake copper, New York.....	10.87½	10.87½	11.12½	11.12½	11.12½	11.12½
Electrolytic copper, N. Y.*.....	10.25	10.25	10.25	10.75	10.75	10.75
Straits tin, spot, N. Y. ....	29.87½	29.85	—	29.80	30.00	29.80
Zinc, East St. Louis.....	4.25	4.25	4.25	4.25	4.27½	4.30
Zinc, New York.....	4.60	4.60	4.60	4.60	4.62½	4.65
Lead, East St. Louis.....	5.35	5.35	5.35	5.35	5.35	5.35
Lead, New York.....	5.50	5.50	5.50	5.50	5.50	5.50

\*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

spot standard available at £134 5s., future standard at £135 17s. 6d., and spot Straits, at £136. The Singapore price today is £138 2s. 6d. Stocks in London warehouses on Sept. 13 were 25,563 tons, an increase for the week of 222 tons, another very large total.

### Lead

This market is the steadiest of the major non-ferrous metals. Prices are firm and unchanged at 5.35c., St. Louis, in the outside market, with the quotation of the leading interest at 5.50c., New York. Demand has been fairly good and there is some encouragement from inquiries for future needs, extending into October.

### Zinc

Lack of demand has caused further weakness in prime Western zinc, the quotation for the last few days hav-

ing fallen to 4.25c., East St. Louis, or 4.60c., New York, for delivery through November. The market is still under the shadow of the large increase in stocks in August. Ore at Joplin is quiet with an advance of \$1 a ton having been realized on Saturday at \$32. Sales were about 9000 tons, with production for last week at 8500 tons and shipments close to this total. The ore surplus is estimated at about 34,600 tons.

### Antimony

Demand for Chinese metal continues light, with quotations at 7.75c., New York, duty paid, for all positions.

### Nickel

The long-established quotations continue at 35c. a lb. for wholesale lots of ingot nickel, with shot nickel at 36c.,

## New York, Chicago or Cleveland Warehouse

### Delivered Prices, Base per Lb.

High brass .....	17.50c.
Copper, hot rolled, base sizes.....	20.50c.
Copper, cold rolled, 14 oz. and heavier, base sizes.....	22.75c.
Seamless Tubes—	
Brass .....	22.50c.
Copper .....	22.75c.
Brass Rods .....	15.87½c.
Brazed Brass Tubes.....	25.12½c.

## New York Warehouse

### Delivered Prices, Base per Lb.

Zinc sheets (No. 9), casks .....	9.75c. to 10.25c.
Zinc sheets, open.....	10.75c. to 11.25c.

## Metals from New York Warehouse

### Delivered Prices, per Lb.

Tin, Straits pig.....	32.00c. to 33.00c.
Tin, bar .....	34.00c. to 35.00c.
Copper, Lake .....	12.75c.
Copper, electrolytic .....	12.50c.
Copper, casting .....	12.25c.
Zinc, slab .....	6.25c. to 7.25c.
Lead, American pig.....	6.00c. to 7.00c.
Lead, bar .....	8.00c. to 9.00c.
Antimony, Asiatic .....	10.00c. to 10.50c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure).....	24.00c. to 25.00c.
Alum. ingots, No. 12 alloys .....	23.00c. to 24.00c.
Babbitt metal, commercial grade .....	25.00c. to 35.00c.
Solder, ½ and ¼.....	22.50c. to 23.50c.

## Metals from Cleveland Warehouse

### Delivered Prices, per Lb.

Tin, Straits pig.....	34.75c.
Tin, bar .....	36.75c.
Copper, Lake .....	12.25c.
Copper, electrolytic .....	12.25c.
Copper, casting .....	11.75c.
Zinc, slab .....	5.75c. to 6.00c.
Lead, American pig.....	6.25c. to 6.50c.
Lead, bar .....	8.75c.
Antimony, Asiatic .....	12.50c.
Babbitt metal, medium grade.....	17.50c.
Babbitt metal, high grade.....	38.00c.
Solder, ½ and ¼.....	21.75c.

## Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses. (Prices quoted are nominal. Holders of metal are generally unwilling to part with stock at present low levels.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	8.75c.	9.50c.
Copper, hvy. and wire	8.50c.	9.25c.
Copper, light and bottoms .....	7.50c.	8.25c.
Brass, heavy.....	5.00c.	6.25c.
Brass, light.....	4.25c.	5.25c.
Hvy. machine composition .....	7.75c.	8.50c.
No. 1 yel. brass turnings .....	5.50c.	6.25c.
No. 1 red brass or compos. turnings... ..	7.00c.	8.00c.
Lead, heavy.....	4.25c.	4.75c.
Lead, tea.....	3.00c.	3.50c.
Zinc .....	2.25c.	2.75c.
Sheet aluminum.....	7.50c.	9.50c.
Cast aluminum.....	7.00c.	9.00c.

and electrolytic nickel in cathodes at 35c.

### Aluminum

Virgin metal, 98 to 99 per cent pure, is obtainable at the published price of 22.90c., delivered.

### Non-Ferrous Metals at Chicago

CHICAGO, Sept. 16.—Sales continue to make moderate gains. Prices for copper are off and quotations at 11c. a lb. are common at Chicago. The old metal market is dull and many prices are lower.

*Prices per lb., in carload lots:* Lake copper, 11c.; tin, 30.50c.; lead, 5.45c.; zinc, 4.35c.; in less-than-carload lots, antimony, 9c. On old metals we quote copper wire, crucible shapes and copper clips, 8.50c.; copper bottoms, 7c. to 7.50c.; red brass, 7c. to 7.50c.; yellow brass, 5c. to 5.25c.; lead pipe, 4c.; zinc, 1.50c. to 1.75c.; pewter, No. 1, 15c.; tin-foil, 17.50c.; block tin, 22.50c.; aluminum, 6.50c. to 7c.; all being dealers' prices for less-than-carload lots.

## Reinforcing Steel

### Cincinnati Viaduct Will Take 4000 Tons

LETTINGS of reinforcing steel the past week were light, totaling only 2550 tons, compared with 6000 tons a week ago. New projects call for 4350 tons, of which 4000 tons is for a viaduct in Cincinnati. Awards follow:

BRONX, New York, 400 tons, sewer work; placed by Clemente Contracting Co., Bronx, with Concrete Steel Co.  
BROOKLYN, 225 tons, Franklin Furniture Co. warehouse, to Turner Construction Co.  
BROOKLYN, 180 tons, garage, Standard Oil Co. of New York, to Concrete Steel Co.  
NEW YORK, 175 tons, subway route 103, section 3, and route 101, section 2; placed by Hart & Early, Inc., New York, with Izzo Brothers.  
YONKERS, N. Y., 230 tons, tunnel for New York Board of Water Supply; placed by Patrick McGovern, Inc., New York, with Concrete Steel Co.  
SOMERSET HILLS, N. J., 400 tons, Veterans' Hospital, to Trucon Steel Co.  
SANTA CRUZ, CAL., 120 tons, school, to W. C. Hrucek & Co.  
OAKLAND, CAL., 185 tons, Fourteenth Street wharf, to Pacific Coast Steel Corp.  
LOS ANGELES, 150 tons, warehouse for Los Angeles Soap Co., to unnamed bidder.  
PASADENA, CAL., 100 tons, light plant, to an unnamed bidder.  
SACRAMENTO, 100 tons, highway work in Los Angeles County, to an unnamed bidder.  
SACRAMENTO, 277 tons, State bridge over San Gabriel River, to an unnamed bidder.

### Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW YORK, 800 tons, Riverside Drive ramp connecting with Fort Lee bridge;

William P. McGarry Co., Brooklyn, low bidder on general contract.

BERGEN COUNTY, N. J., 500 tons, State highway section 7, route 4, Passaic River bridge and approaches; general contract let to Maggi & Schoonover, Paterson, N. J.

BERGEN COUNTY, N. J., 1500 tons, pavement and approaches, Fort Lee bridge; general contract awarded to George M. Brewster & Son.

HACKENSACK, N. J., 800 tons, State highway to Arcola; general contract let to George M. Brewster & Son.

CINCINNATI, 1000 tons, viaduct for Cincinnati Union Terminals Co.; bids close Oct. 20.

LOS ANGELES, 138 tons, Little Dalton wash storm drain; bids Sept. 22.

SAN FRANCISCO, 200 tons, theater, Ocean Avenue; bids opened.

## French Automobile to Be Made in United States

American Mathis, Inc., a newly incorporated company, which has been formed to manufacture the Mathis automobile, a small car of French design, has announced a public offering of stock. It is said that the company will start manufacturing cars next year, but the probable manufacturing site has not been announced. Initial capacity of 50,000 cars a year has been planned.

E. E. C. Mathis, head of the company which manufactures the Mathis car in France, is also president of the American company. Other officers include Gaston Liebert, Minister Plenipotentiary in the French Diplomatic and Consular service, who is vice-president and secretary; H. W. Alger of Chicago, treasurer. Edward Ver Linden, president of the Central Oil Co., Detroit; E. J. Hall, vice-president of the American Car & Foundry Motors Co., New York; Eduard Cournard, treasurer and vice-president of the General Bronze Corp., New York; Charles B. Bohn, president of the Bohn Aluminum Co., Detroit, are directors.

## Railroad Equipment

Illinois Central has definitely abandoned its plan to buy about 2300 freight cars, inquiry for which was issued in the late spring.

Tennessee Copper Co. has ordered 50 acid tank cars from General American Tank Car Corp.

New York, New Haven & Hartford has ordered two steel underframes.

Pennsylvania Salt Mfg. Co. is inquiring for three to five acid tank cars.

More than 150 persons attended the demonstration and lecture on stainless steel conducted at the Cincinnati plant of Joseph T. Ryerson & Son, Inc., Thursday, Sept. 11. Griswold Van Dyke, manager of the special steel department of the company, was the principal speaker. Lewis E. Skinner, manager of the Cincinnati plant, was in charge of the meeting. Representatives from Columbus, Dayton and Middletown, Ohio, and Louisville, Ky., attended.

## Large Expenditures for Water Supply Systems

WASHINGTON, Sept. 16.—Appropriations of approximately \$100,000,000 have been made so far this year by 52 widely scattered cities of the United States on the improvement and expansion of their water supply systems. In some instances the appropriations have been expended. The information was gathered by the Iron and Steel Division, Department of Commerce, from an informal questionnaire it sent to city officials at the request of business organizations. The figures are said to be exceptionally large when compared with those for previous periods. Some cities have reported their expenditures the highest on record.

The replies, according to the division, indicate that the number of residents affected by this work is about 28,750,000 and that the average expenditure per citizen in the reporting cities is just short of \$3.50. The appropriations include not only plans for the extension of pipe lines, but also the erection of dams, power and pump houses and filtration beds.

A feature of the reports was the almost universal statement that this particular phase of municipal activity had been considerably expanded during 1930 and that the work undertaken had usually required the services of a much larger number of workmen than would ordinarily have been the case. Requirements for materials naturally have also been unusually heavy in the instances cited. Many of the projects reported will not be completed during the current calendar year and several large projects are reported to be about to get under way.

## Proposed New Rates on Coke Suspended

WASHINGTON, Sept. 16.—The Interstate Commerce Commission has suspended until April 15 the operation of schedules which propose changes in rates on coke between points in Central Freight Association and Illinois territories. The schedules propose numerous increases and some reductions.

## Another Sharp Shrinkage in Trackwork Shipments

Shipments of trackwork for T-rail track of 60 lb. a yard and heavier in August are reported by the American Iron and Steel Institute at 6812 net tons. This is the smallest figure since the monthly shipments were first made public. It compares with 8774 tons in July, which was previously the second smallest monthly figure, and with 14,818 tons in August, 1929. The August total was about half as great as the average monthly shipments in 1929—13,510 tons.



# Motor Car Output Dips; Year's Total Estimated at 3,800,000 Units

DETROIT, Sept. 15.

**T**HAT automobile production in September will dip below the August level becomes increasingly evident as the month progresses. The Ford Motor Co. is likely to account for about 100,000 cars, or approximately the same volume as in August. Buick's output is set at 500 units a day, against 850 during the greater part of last month. The Chrysler-owned companies are doing relatively little, while Hudson-Essex is making ready a new car as rapidly as possible. Oakland-Pontiac and Oldsmobile-Viking are reported to be on rather lean schedules. In a year of impaired buying power, when the quality group naturally would be hit by a depression, the well-sustained activities of Packard and Cadillac are noteworthy. Probably the largest drop in operations this month will be in the Chevrolet plants, which are in the midst of the task of changing over production facilities for the new model.

The American Austin Co. seems to be an enigma to the industry. It declares that its assembly factory at Butler, Pa., is shipping 200 cars daily and that unfilled orders are of somewhat amazing proportions, in view of general conditions in the automobile industry. Yet the old-line automobile man cannot bring himself to the belief that this newcomer is here to stay, although he is willing to grant that the company's management has shown unusual cleverness in the merchandising of its product.

Looking ahead to the last quarter of the year, men close to the industry feel that October may bring a mild gain over September in production, although output for these two months is likely to be nearly the same. November and December, on the other hand, will see the normal seasonal decline. In other words, Detroit is resigned to the fact that the fall months are not bringing much, if any, upward trend in activities. It is safe to say that unless unexpected factors suddenly alter the present situation, motor car production in the United States and Canada in 1930 will not be over 3,800,000 units, as contrasted with 5,621,709 units in 1929. While this represents a stunning fall from the amazing peak attained last year, it is necessary to go back only to 1927 to get a comparable year. The output then was 3,580,380 cars. With 3,800,000 taken as this year's figure, the volume would be about 600,000 units less than the average for the

Production schedules in automobile industry indicate that this month's output will fall below that of August.

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Total for the year now estimated at 3,800,000 units, which would be lowest since 1927.

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Believed that October may bring a mild gain, with production tapering off in two final months of year.

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Foundry activities in Michigan territory at low ebb.

seven years from 1923 to 1929 inclusive, which was 4,379,275 cars.

In measuring this year's performance in the automobile industry, one must remember that the tremendous carry-over of cars from 1929 contributed heavily toward depressing production in the early months of 1930. That is, the industry last year was in a period of false prosperity. Especially in the late months of 1929 it built tens of thousands of cars it could not sell. The far-reaching ill effects of this unhealthy situation, however, have not been without benefit, for automobile companies have had a lesson. Almost all year much effort has been directed toward reducing stocks in the hands of dealers, with the result that today inventories of finished cars are at the lowest point in years. It is almost certain that manufacturers will continue to adhere to this policy of turning out only cars for which there are immediate retail sales.

## Foundry Activities at Low Ebb

**P**IG iron buying in the Detroit district has been at low ebb. Many large automobile foundries are doing little or nothing. The Chevrolet foundry, which went down early this month, will not resume work until Sept. 22, although it is understood that it will have a heavy schedule for at least 60 days after it gets under way again. The Oakland foundry at Pontiac was closed in August and may not get into production again until the end of September. One large foundry in the western part of Michigan is still idle and another is doing little more than one day's work a week. The Buick foundry and the

Dodge, which is serving all of the Chrysler companies, are fairly busy; so are the Packard and Cadillac units. Despite this semi-paralysis which seems to have fallen upon the foundry industry, pig iron dealers declare that September shipments to their customers will be about on a par with those of August. This, of course, is far from satisfactory, but in view of general conditions is regarded as promising.

## Stampings Are Gaining Headway

**S**TAMPINGS still are gaining headway in the automobile industry. In seeking an explanation for the trend toward stampings, one might well give credit to the research work which steel companies have done in the past few years in producing material which will stand up under severe applications. They have paid close attention to developing sheets and plates which can be formed into intricate shapes without reducing their strength or wearing qualities. Thousands of dollars have been expended in solving problems put up to them by automobile manufacturers, but in the end they have derived the benefit of selling larger tonnages in the Detroit district. Many cases can be cited of automobile makers who had designs of parts which were impractical until the steel companies took hold of the matter and put material through a processing system which made feasible the use of these designs. One of the outstanding jobs made possible by a combination of the steel makers' and fabricators' skill is the fender of the new Reo car, which will be disclosed to the public early in October.

## Scrap Supply Is Scarce

**A** NEW scrap consumer, the Great Lakes Steel Corporation, has entered the local scene. It is reputed to have made large purchases of heavy melting steel in recent weeks, taking advantage of low prices to build up substantial yard stocks for its new open-hearth furnaces. Incidentally there is little scrap coming out of automobile plants these days. The September list of one important maker has scarcely a fourth of the normal tonnage usually produced by this factory, and this is fairly representative of the general situation. With so little scrap finding its way into the market, it is little wonder that dealers are bidding prices up in

order to get satisfactory quantities of material.

#### Ford Makes Remarkable Showing

AUTOMOBILE people are moved with a mingled feeling of admiration and wonder when they contemplate the remarkable showing this year of the Ford Motor Co. At a time when business has been far below the level of 1929, the Ford company has maintained production close to last year's record. In the first eight months of 1930, it turned out well over 40 per cent of all the passenger cars and trucks manufactured in the United States and Canada, as compared with 30 per cent last year. General Motors, on the other hand, has produced only around 60 per cent of the cars made in 1929. Ford and General Motors combined accounted for 74 per cent of the total output in the first seven months of this year.

#### Subjects Selected for Gray Iron Meeting

Fundamental issues confronting gray iron foundrymen will be considered at the third annual convention of the Gray Iron Institute to be held in Cleveland, Oct. 8. Technical research, progressive marketing, beneficial cooperation and profitable cost control are some of the vitally important subjects to be brought before the convention.

The program of speakers and subjects as so far arranged includes: "How Research Is Benefiting Industry," Dr. Zay Jeffries, Aluminum Co. of America, National Tube Co. and General Electric Co.; "Modern Day Merchandising," John S. King, King & Wiley & Co., Inc., Cleveland advertising agency; "The Consumer and Producer Profit Through the Trade Association," Philip P. Gott, assistant manager Trade Association Department, Chamber of Commerce of the United States; "Reasons Why the Standard Cost System Should Be Used," discussion led by A. C. Denison, president, Fulton Foundry & Machine Co., Cleveland.

#### Construction Costs Low

August showed the fifth consecutive decline in construction costs in the United States, according to an analysis by the Associated General Contractors of America. The index was 198.4, compared with 100 in 1913. One year ago it was 203, while in July of this year it was 199. The opinion is expressed that a further drop will not be experienced in the present movement.

Construction costs have varied little in the last seven years, it is stated. The upward trend in the cost of labor has just about offset the downward trend in the cost of material. During the current year the index number for labor wages has remained stationary at 232, while basic material prices have declined in five months from 184 to 176, being at the lowest level of the past four years.

# To Promote Steel Castings

## Steel Founders' Society Aims to Develop New Uses and New Markets

NEW uses for steel castings developed considerable discussion at a meeting of the Steel Founders' Society of America, Inc., held in Pittsburgh on Sept. 10 and 11. Reports of three committees representing the three principal sections of the country in which the society operates were presented by their respective chairmen, and indicated that the association is making considerable progress in this field.

W. H. Worrlow, Lebanon Steel Foundry Co., Lebanon, Pa., reported that the members of the committee which he heads had investigated the use of cast steel for manhole covers by contacting the various public utilities in the cities represented. Some orders have resulted, and in other cases careful investigations are in progress. Cast steel traffic signals were also suggested, and possibilities of storm sewer gratings were considered. The committee functioning in the Milwaukee district, headed by L. S. Peregro, Sivyer Steel Casting Co., Milwaukee, recommended the use of steel ingot molds for small non-ferrous ingots, and reported that considerable business could undoubtedly be developed in this field.

In an effort to further the use of steel castings, the society decided to have the words "cast steel" molded on all castings made by members. This practice is designed to identify such castings easily and to popularize the term. It is also hoped that the public will become cast steel minded, and work in this line will be furthered by cooperative advertising campaigns now under consideration.

Efforts to make the industry more mutually cooperative were embodied in a proposal to hold a conference of salesmen at an early meeting of the society. It was suggested that defending the present market is just as important as the development of new uses, and that salesmen are in a better position to aid the industry in this direction than any other group of employees.

#### Fair Prospects for Fall

In reporting on business conditions and outlook, 43 of 58 companies reporting indicated fair prospects for fall. A poor outlook was seen by 12 companies, while three considered the outlook good. A majority of the companies represented at the meeting reported operations so far this month at about the same rate as that prevailing in August. In a few cases declines had occurred, and only one or two companies could report improvement. Among the favorable factors reported was a distinct upward trend in the requirements of machine tool builders during the last month. New England companies especially remarked on this condition,

while builders of heavy machinery and equipment for steel mills reported a good demand for their products. Foundries serving the railroad trade reported prospects for the remainder of the year to be rather poor.

#### Progress in Industrial Research

Recent progress in industrial research was outlined by Dr. L. W. Bass, executive assistant of Mellon Institute of Industrial Research. He presented tables to show that rolling mills and steel plants stood last in a list of industrial groups in percentage of capital invested for research purposes. The average expenditure for research in the steel plant and rolling mill group is 0.4 per cent, as compared to 1.3 for all industry, and 2.1 for metal-working plants. Chemicals lead the list with an average investment for research of 2.4 per cent.

Research work among the leading industrial groups is generally directed to four principal purposes: to reduce production costs, to improve quality of product and service, to develop new fields of application, and to develop by-products or new materials. In most industries the largest percentage of research expenditure goes to improve quality of product and service. Among rolling mills and steel plants the figure stands at 34 per cent, with 28 per cent going to reduce production costs, and 25 per cent for new fields of application. Development of by-products and new materials takes only 13 per cent of the research investment for that industry. In the metal-working group 37 per cent goes for improvement of quality, 30 per cent for lower production costs, 25 per cent for new fields of application, and only 8 per cent for by-products and new materials.

Mr. Bass enumerated recent important research developments in the metallurgical industry, both from the standpoint of new products and new processes. He also cited simplified practice, reclamation of waste, utilization of waste through by-products, installation of material-handling equipment, and improved lighting as important fields in which research activity has been prominent in recent years.

#### Urges Protection of Labor

James J. Davis, Secretary of Labor, speaking at the luncheon meeting, urged industrial officials to protect the skilled and semi-skilled laborers of their plants as a safeguard to their greatest assets. He pointed out that this is particularly important in times of depression. Mr. Davis cited unfair competition as a leading factor in ruining business and forcing companies to sell products below cost.

# New Steel Merger Discussed

Newton Steel Co. May Be Consolidated With  
Corrigan-McKinney

NEGOTIATIONS are in progress for a merger of the Newton Steel Co. with the Corrigan-McKinney Steel Co., Cleveland. A controlling ownership in the latter company was recently acquired by the Cliffs Corp., of Cleveland, a holding company in which Cyrus S. Eaton and William G. Mather are prominently interested. This holding company also owns the Cleveland-Cliffs Iron Co.

The Newton Steel Co., with plants at Newton Falls, Ohio, and Monroe, Mich., has depended largely on the Corrigan-McKinney company for its sheet bars, and the merger therefore probably would work out to the advantage of the latter company, as it would provide a permanent outlet for part of its semi-finished steel.

The purchase of the Corrigan-McKinney company by the Cliffs Corp. and the election of William G. Mather, who had been chairman of the board of the Otis Steel Co., as its president, led to the expectation that the Otis Steel Co. would be merged

with the Corrigan-McKinney company, and this merger is still regarded as an ultimate possibility, although there is no evidence that definite steps have been taken toward its consummation. The two plants adjoin.

A few months ago the Newton company completed its new mill at Monroe, Mich., which was built primarily to serve the automobile industry, but the low rate of production in the motor car industry has kept the Monroe plant in a state of idleness a part of the time.

News of the negotiations between Newton and Corrigan-McKinney is the first intimation of the future merger plans of Cyrus S. Eaton, who admitted on the witness stand in the trial at Youngstown involving the Bethlehem-Youngstown Sheet & Tube merger that he had other merger plans in prospect. Mr. Eaton was excused by the court from giving any details as to what companies he planned to bring together.

## Trumbull-Cliff Furnace to Be Enlarged

The Republic Steel Corp., which, as reported last week, has blown out the Trumbull-Cliffs blast furnace at Warren, Ohio, is preparing for its expansion into the largest furnace of the corporation. The cost of the improvement will approximate \$325,000.

When completed, the furnace will have a daily capacity of 1000 tons, an increase from 750 tons. The steel and machine work necessary for the enlargement have been under way for some time. The work is expected to be finished and the furnace relighted by Nov. 1.

## Oil Well Supply Co. Name To Be Changed

Following approval by stockholders of the Oil Well Supply Co., Pittsburgh, of its sale to the United States Steel Corp., as reported in THE IRON AGE last week, transfer of assets will begin immediately and be completed on or before Sept. 30. The treasury stock of the Oil Well company and its franchise to be a corporation are not included in the sale of the assets, and company stockholders have approved change of name to the Pittsburgh United Corp. As present officials are likely to become affiliated with what probably will be made a new subsidiary of the Steel corporation, new directors and officers will be elected at a subsequent meeting.

Oil Well Supply Co. will receive

64,992 shares of United States Steel common stock and \$6,865,800 in cash or common stock of the Steel corporation, according to terms of the sale. The stock payment if made is to be rated at the closing price of United States Steel stock two days before the date of closing the deal. Pittsburgh United Corp. assumes indebtedness of its predecessor company in the form of \$800,000 of 6 per cent guaranteed gold debentures of the Wilson-Snyder Mfg. Co., which was a subsidiary.

## New Tariff Commission Ready to Begin Work

WASHINGTON, Sept. 16.—The reorganized bi-partisan Tariff Commission is expected to begin work at once on the big program ahead of it, now that all but one of the six members have been named by President Hoover. Perhaps the largest undertaking before the new commission is that of conducting numerous investigations under the revamped flexible provision of the Hawley-Smoot act. Pig iron is one of the products to come within this survey.

Appointments to the commission announced today by President Hoover were Dr. John Lee Coulter, North Dakota, at present chief economist of the commission; Edgar B. Brossard, Utah, at present chairman of the commission, and Alfred P. Dennis, Maryland, also a member of the commission. The reappointment of Mr. Brossard and Mr. Dennis had been generally predicted. The sixth and

last member probably will be chosen within the next 10 days. Delay in this selection was due to declination of the position by a prospective appointee. Henry P. Fletcher of Pennsylvania, the first new member announced, will be chairman of the commission. Thomas Walker Page of Virginia was selected some time ago also. Fletcher, Coulter and Brossard are Republicans. Page and Dennis are Democrats.

## Steel Corporation's Unfilled Orders Fall Sharply

There was a large decrease in the unfilled orders of the United States Steel Corporation in August—441,851 tons. This showing is the poorest for any August since 1923, when the loss was a little larger. On Aug. 31 the unfilled orders were 3,580,204 tons, compared with 4,022,055 tons on July 31. A year ago the total was 3,658,211 tons. The August decrease follows an increase in July of 53,991 tons which was preceded by three months of decreases. Unfilled tonnage at the end of each month for the past two years and eight months follows:

	1930	1929	1928
December	4,417,193	3,976,712	
November	4,125,345	3,673,000	
October	4,086,562	3,751,030	
September	3,902,581	3,698,368	
August	3,580,204	3,658,211	3,624,043
July	4,022,055	4,088,177	3,570,927
June	3,968,064	4,256,910	3,637,000
May	4,059,227	4,304,167	3,416,822
April	4,354,220	4,427,763	3,872,133
March	4,570,653	4,419,718	4,335,206
February	4,479,748	4,144,341	4,398,189
January	4,468,710	4,109,487	4,275,947

## Testimony in Merger Suit to End This Week

The trial of the action to enjoin the Youngstown Sheet & Tube-Bethlehem Steel merger enters its final phases at Youngstown this week, when the introduction of testimony and cross-examination of witnesses will be concluded. The case has been in session since June 25, with several interruptions. Attorneys have three weeks in which to prepare their arguments and unlimited time at their disposal for the presentation of their case.

In the importance of the litigation, the prominence of the witnesses, the cost to the litigants, the volume of testimony and in other respects, the trial has been one of the most notable in the country, with an industrial issue at stake. The transcript in the case now covers 6000 pages and includes over 2,000,000 words.

## Report Urges Safety Work

A report on the "Cost of Accidents to Industry," by F. S. Crawford, has been issued by the Bureau of Mines. Particular emphasis is given to the fact that accidents cost money far beyond the medical bills, compensation and insurance premiums paid. The disorganization of smoothly running operations causes many extra costs to creep in.



## Pratt & Whitney's 70th Anniversary Oct. 1

Wednesday, Oct. 1, will be observed by Pratt & Whitney Co., Hartford, Conn., as its seventieth anniversary. The celebration will take the form of a reunion of as many old employees as can be gathered together. Clayton R. Burt, president, is planning to hold open house at the plant in Hartford and will welcome all Pratt & Whitney men who can be present. The entire plant will be open for inspection in full operation at 1 o'clock on that day, and arrangements are being made to take visitors through the various departments and buildings. All previous employees of the company are invited to attend this inspection.

In the evening the company will honor by a banquet at the Hartford Club all Pratt & Whitney men who have served the company 20 years or more. Many outstanding men of the machine tool industry have been invited to attend. It is expected that the gathering will number more than 400.

In 1860, Francis A. Pratt and Amos Whitney, at that time young machinists in Hartford, decided to start their own enterprise. They rented a single, unpretentious room in Potter Street where, after hours, they worked

at the building of machines of their own design. Such was the modest beginning of Pratt & Whitney. Today the company employs more than 2000 persons.



C. R. Burt

Sept. 11 while returning on a train from a business trip to New York. He was 65 years of age.

FRANCIS STANLEY NORTH, president of the Union Special Machine Co., Chicago, died Sept. 9, following a long illness. He was born in Chicago in 1875, the son of William Stanley North, founder of the Machine company. He was graduated from Yale University in mechanical engineering in 1897. A few years later he returned to Chicago and became associated with the Machine company, of which he became president in 1913.

## Census Distribution Data to Be Released Soon

WASHINGTON, Sept. 16.—It is stated at the Bureau of the Census that it is not possible to indicate when distribution figures can be released showing sales by the iron and steel, metal-working and other heavy-line industries. Just now figures of this kind are being prepared for a number of manufacturing lines, and the first was issued on sales of motorcycles in 1929 made by manufacturers to wholesalers, retailers, and other purchasing sources. There soon will follow similar figures as to ammunition. These data cover sales by the affected manufacturers for the entire country, and are the first of the kind ever compiled by the Bureau of the Census. It is hoped, however, to get out such figures for the basic industries within a reasonably short time.

The first census distribution figures for wholesale and retail establishments will be made public on Sept. 22. These figures will cover establishments for cities of 10,000 and over, each release to deal with one town. The first release will relate to distribution by wholesale and retail establishments of El Paso, Tex. Similar releases are in course of preparation for Trenton, N. J., Syracuse, N. Y., and Pueblo, Colo., and soon will be available. Others will follow as quickly as they are ready and it is expected to issue approximately 700 such reports by the end of 1930.

Edgar E. Brosius, Inc., Pittsburgh, maker of special blast furnace and steel plant equipment, has completed an addition to its plant at Sharpsburg, Pa., which increases floor space by more than 100 per cent. New offices and drawing room have also been added.

St. John X-Ray Service Corporation, 505 Fifth Avenue, New York, announces the removal of its laboratory to the Eveready Building, 30-20 Thomson Avenue, Long Island City, N. Y. The announcement states that the laboratory is prepared to X-ray anything which can be so examined up to 5 tons.

## OBITUARY

GEORGE E. KLINGELHOFER, president and founder of the Pittsburgh Bridge & Iron Works, Pittsburgh, died at his home in that city on Sept. 14, aged 66 years. He had been engaged in the steel industry for the greater part of his business career, having been identified with the pipe business before founding the Bridge & Iron company in 1905. Mr. Klingelhofer had been active in the work of the American Institute of Steel Construction, Inc., since its founding, and at the time of his death was serving on the board of directors.

W. F. HUTCHINSON, general manager of the Rud Machine Co., subsidiary of the Pioneer Steamship Co., Cleveland, engaged in marine repair work, was killed in an automobile accident Sept. 11. He was 33 years of age.

D. OWEN BROOKE, formerly identified with the Birdsboro Steel Foundry & Machine Co., died at his home in Birdsboro, Pa., on Sept. 7, aged 71 years. He went to Birdsboro in 1881 as chemist at the blast furnaces of the E. & G. Brooke Iron Co. Later he spent several years in Kansas and in 1886 returned to Birdsboro, identifying himself with the Brooke interests there. He retired six years ago because of failing health.

J. L. DAWSON SPEER, who, until his retirement some years ago, had been engaged in the iron and steel brokerage business at Pittsburgh, died in that city on Sept. 12, aged 66 years.

EDMUND H. JONES, president and general manager of the Cleveland Folding Machine Co., died suddenly



G. E. Klingelhofer

# PERSONALS

J. S. SUSSMAN, formerly president of Steel & Tubes, Inc., and R. K. SENTER, who for a number of years has dealt in non-ferrous products, have incorporated Pipe & Tube Products Corporation, with offices at 3701 Woolworth Building, New York. They will specialize in supplying pipe and tubing of all kinds for general industrial use. Mr. Sussman was the founder, and served as president, of the Mohegan Tube Co. until its merger with the Elyria Iron & Steel Co., about two years ago. During the war he conducted special research and inspection work for the War Department. During this same period Mr. Senter was supervising non-ferrous production in munitions plants.

W. A. NUGENT, manager of the St. Louis office of the Independent Pneumatic Tool Co., Chicago, has been transferred to Chicago as manager of the Chicago territory. F. J. PASSINO, manager of the Pittsburgh office, succeeds him in St. Louis, and T. J. CLANCY has become manager of the Pittsburgh territory.

C. J. EDWARDS, of Detroit, has been elected president of the Wheeler Metal Products Corp., East Cleveland, Ohio.

GEORGE M. SMITH, formerly general superintendent of the South Chicago works of the Interstate Iron & Steel Co., now part of the Republic Steel Corp., has resigned and has been spending a vacation in Canada.

A. A. GRUBB, director of laboratories, Ohio Brass Co., was scheduled to address the Quad-City Foundrymen's Association on "Sand" at the Fort Armstrong Hotel, Rock Island, Ill., Sept. 15.

GORDON F. DAGGETT has been appointed branch manager for the Wisconsin territory, with offices in Milwaukee, for the Stephens-Adamson Mfg. Co., Aurora, Ill. He was at one time executive secretary for the Wisconsin Mineral Aggregate Association, in which capacity he acted as consulting engineer to the plants in the association.

JAMES C. NELSON, S. O. & C. Co., Ansonia, Conn., was on the program to speak on "Practical Shop Problems" on Sept. 16 before the New Haven, Conn., chapter of the American Society for Steel Treating, at Hammond Laboratory, Yale University.

J. K. WEBB has been made district sales agent, 601 Allen Building, Dallas, Tex., for the Roller-Smith Co., New York.

CHARLES P. ROGERS, president, Beals, McCarthy & Rogers, Inc., Buffalo, was tendered a dinner on Sept. 16 by his associates in celebration of his 50 years' association with the company. He started as an errand boy with the company in 1880 and became a member of the firm 20 years later. In 1918 he and EUGENE J. MCCARTHY bought out the business and ran it as a partnership for 18 months. On the



Charles P. Rogers

incorporation of the company in 1919, Mr. Rogers became vice-president. He was elected president in April, 1929, on the death of Eugene J. McCarthy.

FRITZ W. MEYER, foundry consultant, metallurgist and vice-president of the Mississippi Valley Research Laboratories, St. Louis, sailed Sept. 13 for Europe. After a short visit with his father, who is director and manager of the Sulzer-Diesel Engine Works, Winterthur, Switzerland, Dr. Meyer will tour Europe to study the newest foundry developments in the ferrous and non-ferrous industries. Upon his return to America, he will organize a lecture tour, visiting iron and steel centers.

B. H. MACNEAL has been appointed Southern district manager of the crane-shovel-dragline division of Link-Belt Co., Chicago. He will have headquarters at the company's Birmingham office. The Southern district includes the territory between the Mississippi Valley and the East Coast, and includes Tennessee and North Carolina.

E. S. CONRAD, who has been Coast district manager for the Square D Co. for 10 years, has been appointed general sales manager of the Diamond Electrical Mfg. Co., which is affiliated with the Square D Co.

WILLIAM A. FORRESTER, director of purchases for the Westinghouse Air Brake Co., Wilmerding, Pa., is in charge of program arrangements for the sixth district convention of the National Association of Purchasing Agents, which will be held at the William Penn Hotel, Pittsburgh, on Oct. 16 and 17.

G. S. VON HEYDEKAMPF has resigned as engineer of tests, Babcock & Wilcox Co., Bayonne, N. J., to become research engineer of the Southwark Foundry & Machine Co., Philadelphia. He came to the United States about four months ago and was formerly assistant to Prof. O. FOEPL of the Technical High School, Brunswick, Germany.

OTTO VON HALEM, manager of the organization in Germany concerned with extending the uses of steel, (Beratungsstelle für Stahlverwendung, Düsseldorf) is now making an industrial tour of the United States.

D. A. CURRIE, vice-president and general manager of the Erie Foundry Co., Erie, Pa., sailed on the Europa, Sept. 17, for a sojourn of two or three months in Europe.

JAMES A. FARRELL, president, United States Steel Corp., was the guest of honor at Nancy, France, at a banquet, Sept. 12, at which the French Minister of Public Health, Désiré Ferry, paid tribute to Mr. Farrell as a friend of France in the World War. Mr. Farrell was accompanied on a tour of the French steel plants by Ambassador Paul Claudel and other prominent Frenchmen. At Pont-à-Mousson, the town from which the French explorer, Pere Marquette, started on his trip to the New World, Mr. Farrell presented to the town a seventeenth century map of America and a sculptured decoration from the house where Pere Marquette lived in Pont-à-Mousson.

HARRY T. GILBERT, recently appointed assistant to T. M. GIRDLER, president, Republic Steel Corp., will move his office to Cleveland this week and will be located in the suite in the Union Trust Building now occupied by Mr. Girdler.

## Inquiries More Numerous But Orders Are Few

**I**N all sections of the country the outstanding characteristic of machine tool markets is that inquiries are more numerous, but business is difficult to close. Actually, September business is only slightly ahead of that of August, which for many in the trade was the poorest month since the depression of 1921.

While the fairly large volume of inquiry holds out some promise of betterment in sales volume for the machine tool industry, it is clear that many of the prospective buyers will not place orders until there is general improvement in the business situation.

The National Machine Tool Build-

ers' Association's report for August shows a 25 per cent gain in sales over July, but the better business last month was not enough to turn the three months' average upward. The association estimates that a 15 per cent increase this month would turn the curve upward.

Orders in August are represented by the figure 113.8 (100 being the average of 1922, 1923 and 1924), as compared with 91.1 in July. The three months' moving average at the end of August was 110.2, a decline from 117.3 at the end of the previous month. The extent of the decline in orders from the high point of the year (January) is about 37 per cent.

## Not Much Improvement in Machine Tool Sales Has Yet Developed

The best month of 1929 (February) was about three times the August level.

Shipments of machine tools in August, at 119.6, were at the lowest point of the year. Unfilled orders have gradually been brought down by a rate of shipments heavier than new orders, but the index of unshipped business is still fairly high at 222.6.

The general belief is that a turn for the better has arrived, without expectations of a substantial rate of improvement the remainder of the year.

Prospects include a list for the A. O. Smith Corp., Milwaukee, and woodworking machinery for the Army Air Corp., Dayton, Ohio.

### New York

The promise of betterment in machine tool trade afforded by the increasing number of inquiries since the first of the month has not thus far materialized in a substantial gain in orders. The general observation is that orders are exceedingly difficult to close. This may be due to the fact that customers of the machine tool trade do not yet see much improvement in their own operations, and inquiries for new equipment doubtless were issued with the expectation that September would mark the beginning of at least a seasonal recovery in business generally. While sporadic reports of gains are heard, there is a good deal of disappointment in many quarters that no appreciable change has occurred. In appraising the outlook for the remainder of this year, the machine tool trade is taking a conservative attitude. However, it would not take much of a gain to make an impression because August business sank so low. For some sellers it was the poorest month since 1921, and in one or two instances it was worse than any similar period since before the war. This sharp decline augurs for some sort of a recovery.

### Milwaukee

**W**HILE inquiries for machine tools are more numerous, there has been somewhat greater hesitancy on the part of prospective purchasers in closing transactions, indicating that buying is only for urgent needs. This is especially true of the automotive

industries. The situation as a whole, however, appears brighter and comment on prospects for the remaining months of the year is optimistic.

### Cleveland

**I**NQUIRY for machine tools has improved slightly, but sales show no gain over those of August. Inquiries, largely for single machines, that have come into the market the past few weeks now total a sizable volume. However, orders are being withheld and few releases are expected until the general business outlook is more promising. With a few exceptions, operations of metal-working plants have not increased over August. The Army Air Corps, Wright Field, Dayton, will receive bids Sept. 18 for miscellaneous woodworking machinery for various airports.

### Chicago

**N**EW orders for machine tools are spotty, but the volume remains steady and inquiries are somewhat more numerous. Another Western railroad has asked for prices for estimating purposes. The A. O. Smith Corp., Milwaukee, has come into the market with a fair-sized list. Figures taken by the Illinois Steel Co. were preliminary and purchases are a month or two away. This company has issued a new inquiry for a cold saw. A radio manufacturer has ordered some swedging equipment and will make other purchases. The used tool market is quiet and supplies of good equipment are growing. Evidence that shops are better engaged

is given by the fact that replacement of parts orders are more numerous and pressure is being exerted for prompt delivery.

### Cincinnati

**A**LTHOUGH a slight improvement was noted the past week in demand for radial drills, manufacturers of other lines of machine tools experienced no change in the attitude of buyers. Orders for radial drills were for single tools and came from widely distributed points. The general market, however, continues sluggish; production now averages about 30 per cent. One large manufacturer has adopted the plan of operating alternate weeks to keep as many employed as possible. Others either are alternating forces or reducing the working week.

### Pittsburgh

**I**MPROVEMENT in business reported last week has been well maintained and most of the dealers in this district in the first half of the month had considerably better orders than in the corresponding periods of either July or August. Nevertheless, the most favorable factor in the market is the volume of inquiry, a large part of which involves special tools and equipment requiring considerable research work. Much of this business has been developed during the summer by sales promotion work on the part of machine tool organizations seeking business to offset the light demand for standard tools.

Activity continues in steel mill



equipment and machinery. The Jones & Laughlin Steel Corp. is reported to have placed an order for a merchant mill with a New England builder. The Great Lakes Steel Corp., Detroit, which is completing a new 14-in. bar mill at its new Ecorse, Mich., plant, has authorized construction of a 10-in. mill at the same plant. Considerable expansion is in progress at the Youngstown plant of the Republic Steel Corp. and the Bethlehem Steel Co. is said to be contemplating a continuous sheet mill at its Lackawanna, N. Y., plant.

## New England

**N**EW tool sales the past week were few and used tool dealers report only occasional sales of small lathes, shapers and drilling machines. An

encouraging sign in general business is the return of several hundred mechanics to a Massachusetts shop of the Boston & Maine Railroad and the announcement that additional men will be taken on soon.

One of the most active local machine tool houses sums up the situation as follows: "With little mail received each day and with old prospects deferring purchases, the machine tool market is quieter than it has been at any time since 1921, the year of the last previous business depression so far as we are concerned. The outlook, however, is encouraging for we anticipate a substantial buying movement will set in long before the close of 1930. If one-half of the tools now under consideration of users are purchased machine tool dealers should better than break even in 1930."

## New York

**G**ENERAL contract has been awarded by Brooklyn Brass Works, 263 Scholes Street, Brooklyn, to Samuel Glicksman, 347 Beach Twenty-first Street, Far Rockaway, L. I., for two-story and basement addition, to cost over \$45,000 with equipment. Lee & Hewitt, 152 Market Street, Paterson, N. J., are architects.

National Union Radio Corp. of New York, Inc., 400 Madison Avenue, New York, manufacturer of radio tubes and equipment, with plant at 57 State Street, Newark, N. J., is considering new branch plant near Los Angeles, to cost over \$300,000 with equipment. E. A. Tracey, vice-president, is now in that district to select site.

Columbian Carbon Co., 45 East Forty-second Street, New York, operating natural gas properties, carbon black plants, etc., is arranging expansion program, particularly in natural gas properties in Texas, West Virginia, Kentucky and other States, including pipe line construction. It is proposed to increase capital from 500,000 to 2,000,000 shares of stock, no par value, part of fund to be used for purpose noted. Company recently organized Continental Construction Co., a subsidiary, to build a pipe line from Texas to Chicago, to cost over \$75,000,000.

Board of Education, Park Avenue and Fifty-ninth Street, New York, will break ground at once for new eight-story boys'

technical high school in Brooklyn, to cost close to \$5,000,000, of which over \$1,000,000 will be expended for equipment for all branches of vocational instruction. W. C. Martin, Flatbush Avenue Extension and Concord Street, Brooklyn, is architect for board.

R. H. Macy & Co., Thirty-fourth Street and Broadway, New York, department store, plans an automobile service, repair and garage building for motor trucks and cars in connection with new storage and distributing plant in Brooklyn, to cost about \$180,000. Robert D. Kohn, 56 West Forty-fifth Street, New York, is architect.

A. P. W. Paper Co., 1273 Broadway, Albany, N. Y., is considering expansion with equipment installation to double present capacity, to cost over \$250,000. Controlling interest in company was recently secured by Roger W. Babson, head of Babson Statistical Organization, Wellesley, Mass.

Ovens, power equipment, conveying and other machinery will be installed in new baking plant, 100 x 150 ft., to be built at Coney Island Avenue and Avenue U, Brooklyn, for company whose name has not been announced, to cost about \$130,000. McCormick Co., 41 Park Row, is architect and engineer in charge.

Phelps Dodge Corp., 40 Wall Street, New York, operating copper properties, has voted to purchase a controlling interest in Nichols Copper Co., Laurel Hill, L. I., and will operate as a unit, retaining identity of Nichols company. Last noted interest operates a copper smelting plant and electrolytic refinery at Laurel Hill, as well as a refining plant at El Paso, Tex. Both mills will be continued in service. Nichols organization is also interested in Canadian Copper Refiners, Ltd., which has begun construction of new refinery near Montreal.

Board of Education, Newton, N. J., is considering installation of manual train-

## INDUSTRIAL ACTIVITY

### Prospects as Revealed by a Survey of Construction Projects

**I**NDUSTRIAL projects to the number of 98, none of unusual size, appeared in the last week calling for an expenditure of \$26,500,000, against 79 in the preceding week, totaling \$20,000,000.

In what may be classified as general industry, comprehending plants which will require machinery and factory equipment, the week's reports cover 53 for \$9,400,000, while for the preceding week the number was 61 and the amount \$5,800,000. Included are \$2,000,000 for a pulp and paper plant at Hoquiam, Wash., \$1,200,000 for a cement clinker plant at Jackson, Miss., \$1,000,000 for the American Can Co. at Terre Haute, \$450,000 for a wire works at Cleveland and \$300,000 for an aircraft factory at Wichita.

The oil industry is again conspicuous with

\$4,800,000 in 18 different centers, mostly for oil storage and distribution, with some sizable proposals, such as \$1,500,000 for distribution in Indiana, \$750,000 in California, \$500,000 in Michigan, and \$400,000 each at Harrison, Ark., and Pittsburgh.

Public utility and municipal programs for 14 locations will take \$2,400,000, exclusive of a \$40,000,000 development in Arkansas. Four airport plans are set down for \$1,250,000 and five manual training schools for \$6,100,000, swelled by \$5,000,000 for Brooklyn. Terminal developments, which are to provide various public services, such as storage and refrigeration, were four in number, totaling \$2,600,000, not counting a Cincinnati project of some \$20,000,000.

ing equipment in new junior high school to cost over \$175,000, for which plans are being drawn by Hacker & Hacker, 201 Main Street, Fort Lee, N. J., architects.

Construction Quartermaster, Picatinny Arsenal, Dover, N. J., is asking bids until Sept. 29 for two new operating units for cannon powder blending, five stories, 32 x 40 ft., and one story and basement, 30 x 45 ft.

Hanson, Van Winkle, Munning Co., Matawan, N. J., manufacturer of electroplating equipment and supplies, has leased former plant of Nyberg Automobile Co., Anderson, Ind., for new branch plant to give employment to over 175 persons. Company has option to purchase site, with eight acres adjoining.

Public Service Electric & Gas Co., Terminal Building, Newark, has filed plans for a two-story and basement electric station and distributing plant, 90 x 100 ft., at Orange, N. J., to cost close to \$175,000 with equipment.

Board of Education, Perth Amboy, N. J., is considering purchase of equipment for four manual training shops to be installed in new high school, now in course of construction. John M. Dockstader is supervisor of manual training department.

## New England

**C**ALL for bids on general contract has been authorized by School Board, West Hartford, Conn., for new junior high and elementary grade school costing \$525,000, to include a manual training department. Russell F. Barker, Hartford, is architect.

Wickwire-Spencer Steel Corporation, Worcester, Mass., is considering rebuilding part of plant recently damaged by fire, with loss close to \$50,000 including equipment.

Bethlehem Shipbuilding Corporation, Quincy, Mass., has awarded general contract to H. L. Hauser Building Co., Inc., 263 Summer Street, Boston, for one-story addition for storage and distribution, to cost over \$40,000.

Stratford Rolling Mills, Inc., Stratford, Conn., recently organized by F. C. Keller, Jr., 955 Main Street, Bridgeport, Conn., and associates, plans operation of local plant for reduction of alloy metal products.

Ovens, power equipment, conveying and other machinery will be installed in new plant to be constructed by John J. Nissen Baking Co., 63 Washington Street, Portland, Me., at Waterville, Me., to cost over \$70,000. Horace T. Muzzy, 173 Main Street, Waterville, is architect.

Danbury & Bethel Gas & Electric Light Co., 238 Main Street, Danbury, Conn., has plans for a new equipment storage and distributing plant, including automobile service, repair and garage unit, to cost over \$70,000. Sunderland & Watson, 248 Main Street, are architects.

Cumberland County Power & Light Co., Portland, Me., is disposing of a bond issue of \$2,400,000, part of fund to be used for extensions and improvements in power plants and system.

F. H. Newton Co., 34 Cameron Avenue, North Cambridge, Mass., manufacturer of doors, windows and other millwork products, plans rebuilding part of plant destroyed by fire Sept. 5, with loss over \$50,000 including equipment.

Crawford Oven Co., New Haven, Conn., has moved into its new office and factory building at 200 Shelton Avenue.

George W. Pickering Coal Co., Salem,

Mass., has started work on coal pocket alterations. Conveying equipment will be required.

Salem Electric Lighting Co., Salem, Mass., will spend about \$10,000 on two-story coal-handling plant and equipment.

United Electric Light Co., Springfield, Mass., will install coal pulverizing machinery, belt conveyors and other equipment in a new plant it is about to build.

## Philadelphia

**B**IDS have been asked on general contract for one-story plant, 50 x 240 ft., at 3335 Stokley Street, Philadelphia, to be occupied under lease by Ryan, Scully & Co., Wissahickon Avenue and Yelland Street, manufacturer of furnaces, forges, etc., to cost over \$65,000 with equipment. Eugene A. Stopper, 10 South Eighteenth Street, is architect.

Intercity Oil Co., 322 North Broad Street, Philadelphia, will make extensions and improvements in plant on South Fifty-first Street, including installation of motor oil blending unit, gasoline loading equipment, boiler plant, tanks, loading racks and other equipment, to cost over \$100,000. G. Kendrick Bringham, 4522 Pine Street, is consulting engineer.

Peerless Steel Equipment Co., Philadelphia, recently organized by Conrad Bergmann, 7339 Dungan Road, and associates with capital of \$150,000, plans operation of local factory for manufacture of steel and other metal products and devices. Mr. Bergmann will be treasurer. George Bergmann, 404 West Annsbury Street, and Francis E. Timlin, 207 Gilham Street, are interested in new organization.

Reading Co., Reading Terminal, Philadelphia, plans rebuilding part of car shop and replacement of machinery, including large electric-operated grinding wheel, recently damaged by an engine explosion at Erie Avenue yards.

J. G. Brill Co., Sixty-second Street and Woodland Avenue, Philadelphia, manufacturer of street railroad cars, car trucks, etc., has become affiliated with Cummings Car & Coach Co., 111 West Monroe Street, Chicago, with plant at Paris, Ill. Latter plant will be used by Brill company as a Western division, with Walter J. Cummings, president of Cummings company, continuing in charge. Mr. Cummings has been elected a vice-president of Brill Company; Samuel W. Curwen is president.

Max Metzger, Philadelphia, has leased space in building at Lawrence and Green Streets, for a sheet metal works.

South Jersey Port Commission, Camden, N. J., has awarded contract to Robbins Construction Co., 1137 North Front Street, Philadelphia, for new transit, storage and distributing building, with mechanical loading and handling facilities, to cost \$160,000. This represents part of port development and expansion program of commission, for which a fund of \$2,000,000 has been arranged.

B. E. Taylor, secretary, Department of Property and Supplies, Capitol Building, Harrisburg, Pa., will receive bids until Sept. 24 for additions and improvements in electrical equipment at State Teachers' College, Millersville, Pa. Stewart A. Jellett Co., 1200 Locust Street, Philadelphia, is consulting engineer.

A. E. Shafer, 208 Markle Bank Building, Hazleton, Pa., and associates have organized Eastern Safety Appliance Corporation with capital of \$50,000, and plan operation of local factory for production

of safety mechanical devices and equipment. V. L. Shafer, 177 South Church Street, will be an official of new company.

P. H. Glatfelter Co., Spring Grove, Pa., will build a new power plant at local paper mill, to cost over \$60,000 with equipment.

Quaker City Art Metal Works, 2445 North Second Street, Philadelphia, is asking bids on general contract until Sept. 24 for an addition to cost about \$25,000 with equipment. Alvin C. Bieber, Bonbright Building, is architect.

Stanton Forging Co., Inc., German and Everett Streets, Camden, N. J., manufacturer of steel forgings and forged steel pipe flanges, is building a new plant, 100 x 100 ft., to replace one recently destroyed by fire. New works will have heat-treating department, 30 x 80 ft., with modern equipment. Company specializes in manufacture of tool steel, alloy steel, stainless steel and nitralloy steel forgings. Henry D. Rutter is president and general manager.

## South Atlantic

**P**LANs are under way by Jersey Ice Cream Co., 1726 Pratt Street, Baltimore, for two-story plant unit, 100 x 186 ft., part of structure to be used for storage and distribution, with automobile repair and garage department, to cost about \$100,000 with equipment. McCormick Co., 121 South Negley Street, Pittsburgh, is architect and engineer.

Department of Commerce, Washington, is asking bids until Sept. 26 for automatic gasoline-electric engine generator plants.

Peninsula Terminal Corp., Norfolk, Va., affiliated with Peninsula Ferry Co., has taken over five acres of waterfront property at Cape Charles, Va., for a new terminal, including dock with loading and mechanical-handling facilities, ice-manufacturing plant, cooperage works and other industrial units, to cost over \$200,000 with equipment. G. Hubbard Massey, Norfolk, is consulting engineer.

Bureau of Yards and Docks, Navy Department, Washington, is asking bids until Oct. 1 for improvements in brass foundry at local navy yard.

Champion Fibre Co., Canton, N. C., operating local pulp and paper mill, is planning expansion and improvements, with installation of additional machinery, to cost about \$200,000. Company is affiliated with Champion Coated Paper Co., Hamilton, Ohio.

Western Maryland Railroad Co., Baltimore, has awarded general contract to M. A. Long Co., 10 West Chase Street, for rebuilding part of grain elevator at Port Covington, recently destroyed by fire, with loss of about \$200,000 including elevating, conveying and other equipment. H. R. Pratt is chief engineer.

Board of District Commissioners, District Building, Washington, is asking bids until Sept. 23 for two portable air compressor units, gasoline driven.

Raylaine, Inc., Asheville, N. C., care of G. Jean Nord, Asheville, recently organized by Mr. Nord and associates with capital of \$1,000,000, has acquired property at Biltmore, N. C., as site for new plant for manufacture of synthetic fiber products, with main one-story unit, 150 x 400 ft., storage and distributing plant, power substation, machine shop and other structures, to cost over \$400,000 with machinery, which will be electric operated. Mr. Nord will be

president and general manager; D. Ralph Millard, president, D. Ralph Millard Corp., Asheville, will be treasurer.

Washington Gas Light Co., 411 Tenth Street, N. W., Washington, has arranged with Columbia Gas & Electric Corp., Cincinnati, for supply of natural gas for local distribution. Project will include construction of pipe lines, distributing station and other facilities, to cost about \$200,000. A by-products gas works is being considered.

General Purchasing Officer, Panama Canal, Washington, will receive bids until Sept. 25 for four electric-operated industrial trucks.

Virginia Public Service Co., Charlottesville, Va., has work under way on a steam-operated electric generating plant at Brems Bluff, Va., to cost over \$2,000,000 with machinery. Completion is scheduled early next year.

## Detroit

**G**ENERAL contract has been let by Diamond Power Specialty Corp., 10340 Oakland Avenue, Detroit, manufacturer of soot blowers and other power plant equipment, to W. J. C. Kaufmann, 10610 Shoemaker Street, for a one-story addition to cost about \$40,000 with equipment.

Cohodas Brothers, Inc., Ishpeming, is asking bids on general contract until Sept. 22 for a one-story and basement cold storage and refrigerating plant, to cost about \$70,000 with machinery. D. E. Anderson, Marquette, is architect and engineer.

Roosevelt Oil Co., Mount Pleasant, is carrying out expansion and improvements at local refinery, including installation of processing equipment for production of lubricating oils, storage and distributing equipment, etc., to cost over \$50,000.

Michigan Natural Gas Co., Mount Pleasant, will issue 100,000 shares of stock, no par value, part of fund to be used for development of natural gas properties at Broomfield, with pipe line for service at Mount Pleasant, where distribution will be handled by other interests. Company was organized recently by A. E. Butterfield and V. W. McClintic, Mount Pleasant.

Officials of Chrysler Corp., 341 Massachusetts Avenue, Detroit, have organized Amplex Mfg. Co., a subsidiary, to manufacture other products and equipment than those strictly automotive. It is understood that manufacture will be carried out at Detroit.

Liberty Starter Co., 241 Vinewood Street, Detroit, manufacturer of automobile starting and lighting equipment, etc., has begun one-story addition, to cost over \$30,000 with equipment. Pollmar & Ropes, 2539 Woodward Avenue, are architects.

Lenert Aircraft Co., Pentwater, manufacturer of all-metal aircraft, is considering removal of plant to Dowagiac, where flying field and other increased facilities will be provided, including additional equipment for parts production and assembling.

Pere Marquette Railroad Co., Detroit, is making additions to engine house and shop facilities at Port Huron, in connection with yard expansion.

City Council, Flint, has plans for a new electric-operated pumping station for waterworks, to cost \$80,000 with machinery. Hoad, Decker, Shoecraft & Drury, Ann Arbor, are engineers.

Maise Corp., Detroit, recently organ-

ized, has leased a building at 1651 Grand Boulevard and will establish plant for manufacture of automatic oil burners and equipment, including parts and assembling, units to be distributed complete from factory. Herman C. Maise, formerly vice-president Briggs Mfg. Co., Detroit, manufacturer of automobile bodies, is president.

## Buffalo

**P**LANS have been filed by Niagara Falls Smelting & Refining Corp., 2208 Elmwood Avenue, Buffalo, for one-story addition, to cost about \$25,000 with equipment.

Delco-Lite Co., Dayton, Ohio, manufacturer of isolated lighting plants, is arranging for removal of plant to Rochester, N. Y., where works will be combined with North East Appliance Corp., manufacturer of electric equipment and appliances. Both companies are units of General Motors Corp., Detroit. Expansion will be carried out at combined Rochester works, giving employment to more than 7500 persons.

Dr. George E. Ellis, 11 Fifth Street, Dunkirk, N. Y., and associates have organized Anglim Electric Pasteurizer Co., with capital of \$250,000, and plan operation of local factory for manufacture of electric-operated pasteurizing equipment. Dr. William J. Sullivan, 707 Washington Avenue, is interested in new company.

Pierce, Butler, Pierce Mfg. Corp., 282 James Street, Syracuse, N. Y., manufacturer of furnaces, heaters, boilers, etc., is considering plans for rebuilding part of plant recently destroyed by fire, to cost over \$150,000 with equipment.

Buffalo Market Terminal, 1420-1502 Clinton Street, Buffalo, has taken out a permit for a public market building to cost about \$750,000, to include cold storage and refrigerating machinery, conveying and other handling equipment.

Buffalo Foundry & Machine Co., 1543 Fillmore Avenue, Buffalo, will build an addition to its boiler plant.

## Pittsburgh

**I**MPROVEMENTS will be carried out by Pennsylvania Railroad Co., Pittsburgh, at engine house and shops at South Oil City, Pa., including new turntable, ash pits and other equipment, to cost \$140,000.

Duquesne Baking Co., 223-31 Auburn Street, Pittsburgh, plans installation of ovens, power equipment, conveying and other machinery in connection with rebuilding plant destroyed by fire Sept. 10, with loss over \$150,000.

Westinghouse Electric & Mfg. Co., East Pittsburgh, is arranging for centralization of electric refrigerator manufacture at works at East Springfield, Mass., heretofore carried on in part at that plant and at assembling works at Mansfield, Ohio, and will remove division from latter plant, carrying out parts production and assembling at East Springfield. Company has purchased former plant of New Home Sewing Machine Co., Orange, Mass., and will occupy for expansion. New Home company has recently removed to Rockford, Ill.

Pittsburgh & West Virginia Gas Co., 435 Sixth Avenue, Pittsburgh, an interest of Equitable Gas Co., same address, will

carry out expansion in southwestern Pennsylvania and West Virginia, including drilling wells, pipe line and booster station construction, etc., to cost about \$400,000. Company is completing a new gasoline recovery plant at Rogersville, Pa. Byllesby Engineering & Management Corp., 231 South La Salle Street, Chicago, is engineer.

Airport Commission of Chamber of Commerce, Wheeling, W. Va., is arranging a fund of \$300,000 for a municipal airport, including hangars, repair shops and other field units. A bond issue will be voted at regular election in November.

Sutton Engineering Co., Park Building, Pittsburgh, manufacturer of rolling mill machinery and straightening equipment, is building an addition to its plant at Bellefonte, Pa. Company has purchased a 50-ton electric crane and has installed a 4-in. spindle Landis boring mill for machining its large-type pipe straightening machinery recently developed. J. Blair Sutton is president.

## Milwaukee

**B**IDS are being taken until Sept. 19 by A. L. Kiefer Co., 329 East Water Street, Milwaukee, manufacturer of hotel and institutional equipment, hardware, etc., for new factory, 68 x 120 ft., two stories and basement.

Removal of plant and equipment of former R. J. Schwab & Sons Co., 251 Reed Street, Milwaukee, manufacturer of vapor heating boilers and warm air furnaces, to enlarged works of Cedar Grove Stove Co., Cedar Grove, Wis., has been completed and operation will continue as Schwab Furnace & Mfg. Co. Wisconsin Gear & Engineering Co. has purchased a two-story section of former plant of Schwab company, 40 x 200 ft., and Howard Brass & Copper Co., 407 Grove Street, has taken over foundry section for immediate occupancy.

Wausau Motor Parts Co., 125 West Washington Street, Wausau, Wis., has plans for new factory, 80 x 240 ft., one story and part basement, work to begin as soon as acquisition of new site is completed. Investment of \$50,000 or more is planned.

Water and Light Commission, Wisconsin Rapids, Wis., plans construction of new switchboard building, 41 x 136 ft., for municipal hydroelectric plant on Wisconsin River. Appropriation for building is \$30,000, and for equipment, \$14,250. C. P. Gross is city engineer.

Hansen Canning Machinery Co., Cedarburg, Wis., has placed contracts for a machine shop extension, 28 x 100 ft., one story and part basement.

Oilgear Co., Milwaukee, booked more orders for hydraulic feeds the past week than in any week this year. Sales of broaching machines and hydraulic presses also improved. A plant extension, in abeyance for several months, will probably be undertaken soon.

Cohodas Brothers, Inc., Ishpeming, Mich., are taking bids until Sept. 22 for construction and equipment of new cold storage plant and warehouse to cost \$80,000. D. E. Anderson, Marquette, Mich., is architect.

Frank F. Jackson & Co., 221 Wisconsin Avenue, Milwaukee, has changed its corporate style to Jackson & Fahey Co., with Frank F. Jackson continuing as president and Bernard Fahey, sales manager, becoming vice-president. Company is dis-



tributer of Fenestra steel sash, Kinnear rolling doors, Security freight elevator doors and Weisteel shower and toilet compartments.

Milwaukee Electric Crane & Hoist Corporation reports one of the best weeks this year, having booked 16 3 to 30-ton cranes for 207th Street shops of New York Board of Transportation. Lehigh Valley has purchased three large gantry cranes, and New York, New Haven & Hartford Railroad, one gantry crane.

## Cleveland

**C**ONTRACT has been let by Allied Oil Co., Guarantee Title Building, Cleveland, to Masters & Mullen Construction Co., Rose Building, for pumping plant, boiler plant and other units at new storage and distributing plant, entire project to cost about \$100,000 with equipment.

City Council, Marietta, Ohio, has plans for a municipal electric light and power house, to cost over \$85,000 with equipment. Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., is consulting engineer.

Elyria Magnesium Products Co., recently organized by Arthur R. Bullock, Lake Avenue and West 118th Street, Lakewood, Ohio, and associates with capital of \$50,000, is planning establishment of a new plant at Elyria, Ohio.

Cleveland Wire Works of General Electric Co., 1770 East Forty-fifth Street, Cleveland, has plans for one-story addition, 320 x 370 ft., to cost over \$450,000 with equipment.

Canton Tin Plate Co., Canton, Ohio, recently organized, has taken over former local plant of Carnahan Tin Plate Co., and will install equipment to give employment to about 400 men. William Davey, Mansfield, Ohio, heads new organization.

Dr. George Riebel, Ashland, Ohio, has arranged for purchase of 40-acre tract and plans establishment of airport with hangar, repair shop and other field units.

Cleveland Provision Co., 2527 Canal Road, Cleveland, has plans for a two-story and basement packing plant on West Sixty-fifth Street, with installation of cold storage facilities, mechanical-handling and other equipment, to cost about \$175,000. H. B. Henschien, 1637 Prairie Avenue, Chicago, is engineer.

Superior Wrought Washer Co., Cleveland, has been formed by Frank J. Ols, president and general manager, Walter Mausols, vice-president, and is operating at 10814 Berea Road, manufacturing washers and metal stampings.

## Chicago

**C**ONTRACT has been let by Nimrod Co., Libertyville, Ill., manufacturer of hunting equipment, to Libertyville Construction Co., Libertyville, for new one-story plant, to cost \$40,000 with machinery.

Van Sicklen Corp., Elgin, Ill., manufacturer of automobile accessories, metal novelties, etc., is expanding facilities for new lines of output, including radio equipment and sets for motor car service.

Oakland Foundry Co., Belleville, Ill., specializing in gray iron castings, is planning to rebuild part of plant destroyed by fire Sept. 8, with loss more than \$200,000 with equipment.

M. & L. Bakery Co., 502 West Third Street, Sioux City, Iowa, plans installa-

tion of ovens, power equipment, conveying and other machinery in new two-story and basement baking plant to cost \$160,000. E. R. Swanson, Insurance Exchange Building, is architect.

Board of Education, Saint Louis Park, Minn., is considering installation of manual training equipment in new three-story and basement high school to cost about \$250,000. Stebbins, Haxby & Bissell, 1111 Nicollet Avenue, Minneapolis, are architects.

Frank Parker, formerly vice-president, Briggs & Turivas, Blue Island, Ill., scrap metals, has organized Iron & Steel Products, Inc., Railway Exchange Building, Chicago, and will operate a merchant business in iron and steel products, car parts, railroad supplies, etc. Mr. Parker will be president.

Central States Electric Co., Cedar Rapids, Iowa, is considering a new generating plant near Eldora, Iowa, to cost about \$75,000 with equipment.

Mercury Mfg. Co., 4118 South Halsted Street, Chicago, manufacturer of tractors and trailers, industrial trucks, etc., is planning to rebuild part of plant destroyed by fire Sept. 9, with loss over \$30,000 including equipment.

Minnesota Steel Machinery Co., Bismarck, N. D., has plans for a one-story equipment storage and distributing plant, 50 x 100 ft., to cost \$35,000.

Massolt Bottling Co., 116-28 Plymouth Avenue, North, Minneapolis, plans installation of bottling and capping machinery, conveying and other equipment in new one-story plant to cost about \$45,000. Perry E. Crosier, Phoenix Building, is architect.

## Gulf States

**M**ECHANICAL-HANDLING equipment, elevating, conveying and other machinery will be installed in new local freight terminal to be constructed by Texas & Pacific Railroad Co., Fort Worth, Tex., to cost over \$1,500,000.

Southern Gas Co., Esperson Building, Houston, Tex., has applied for natural gas franchise at Harrison, Ark., and vicinity, and plans construction of pipe lines and distributing facilities from Clarks-ville, about 45 miles, to cost over \$400,000.

Air-O-Matic Mfg. Co., Wichita, Kan., is considering branch plant at Amarillo, Tex., for production of pumping equipment, including parts and assembling departments, to cost over \$30,000.

E. L. Chapman, Taylor, Tex., and associates have begun erection of new oil refinery near city, to cost over \$100,000 with machinery. G. L. Rousey, Taylor, is interested in project.

Texas Power & Light Co., Interurban Building, Dallas, Tex., has plans for a new hydroelectric generating plant in Mountain Creek district, to cost over \$500,000 with transmission lines, work to begin in about 90 days. Company engineering department is in charge.

Penick & Ford, Ltd., New Orleans, food products, has plans for a new one-story cold storage and refrigerating plant, 117 x 120 ft., at Harvey, La., to cost over \$75,000 with machinery. James H. Greer is superintendent.

Mississippi Portland Cement Co., Jackson, Miss., care of W. S. Guest, Phoenix Building, Birmingham, recently formed by Mr. Guest and associates, is considering erection of new mill near Jackson, primarily for production of raw material in clinker form, to be utilized at finishing

mills to be erected in other parts of State and from which distribution will be carried out. Entire project will cost over \$1,200,000. B. R. Alford, Canal Bank Building, New Orleans, is interested in company and will be in charge of construction.

United Gas Co., Houston, Tex., has authorized construction of natural gas pipe line to San Marcos, Tex., and vicinity, to cost over \$100,000 with equipment.

Paten scaffolding Co., 647 West Fifty-fifth Street, New York, manufacturer of suspended and swinging safety scaffolds, ladders, etc., has leased property at Dallas, Tex., for new factory branch, storage and distributing plant. A service department will be installed. Wilbur Johnston, heretofore in charge of St. Louis branch, will be in charge.

Board of School Trustees, Smithville Special Consolidated School District, Smithville, Miss., is considering installation of manual training equipment in new high school, 150 x 200 ft., to cost over \$150,000, for which bids will soon be asked on general contract. W. G. Eckles, 829 Fairview Street, Jackson, Miss., is architect.

Tri-City Gas Co., Gadsden, Ala., has secured franchise for furnishing natural gas at Alabama City, Ala., and vicinity and will build pipe line to cost about \$125,000. Company also plans to supply gas at Attalla, Ala., and will construct additional pipe lines.

Chamber of Commerce, Goose Creek, Tex., is at head of project to construct and operate an airport for communities in this district, and has secured about 200 acres on Hug-the-Coast Highway for development. Project will include hangars, repair shops and other structures, to cost over \$75,000. L. L. Hule is president of Chamber of Commerce.

## St. Louis

**G**ENERAL contract has been awarded by Standard Oil Co., 314 North Jefferson Avenue, St. Louis, to Martin P. Rosenmeyer, Title Guaranty Building, for one-story oil storage and distributing plant, to cost about \$65,000 with equipment. Schlinz & Bailey, Monadnock Building, Chicago, are architects.

Kansas City Power & Light Co., Kansas City, Mo., has disposed of a bond issue of \$3,000,000, part of fund to be used for extensions and improvements.

Bentonville Ice & Cold Storage Co., Bentonville, Ark., plans rebuilding part of ice-manufacturing plant recently destroyed by fire, with loss of \$60,000 including machinery.

White River Power Co., Little Rock, Ark., care of H. C. Couch, president, Arkansas Power & Light Co., Little Rock, recently organized by Mr. Couch and associates, has filed notice with Federal Power Commission that hydroelectric power project on White, North Fork and Buffalo Rivers, Ark., will cost \$47,340,000 and require about 36 months for completion. Three power dams will be built. Sites have been acquired and application for permission made.

Stearman Aircraft Corp., 601 East Thirty-fifth Street, Wichita, Kan., will proceed with new plant for which general contract has been let to Austin Co., Cleveland, consisting of main one-story unit, 200 x 420 ft.; one-story foundry, 40 x 50 ft.; one and two-story boiler house; administration building, 54 x 184 ft.; garage, and other structures, to cost

\$300,000 with machinery. Facilities for parts production and assembling will be provided. Lloyd Stearman is president.

Albert Blackmer, Fayetteville, Ark., is at head of project to establish local brick manufacturing plant, to cost about \$60,000 with machinery. William Moore, Fayetteville, is interested in project.

Quaker Petroleum Co., Fourteenth and Nicholas Streets, Omaha, Neb., has awarded general contract to Parsons Construction Co., Grain Exchange Building for one and two-story oil storage and distributing plant, 50 x 210 ft., and smaller unit, 60 x 100 ft., to cost over \$65,000 with equipment.

Anderson Motor Service Co., Kansas City, Mo., has leased one-story building, 100 x 120 ft., to be erected at 232 Missouri Avenue, for establishment of machine, repair and service plant. General contract has been let to F. H. Crites, 3017 East Twentieth Street.

Foley & Hallquist, manufacturers of steel cutting dies, have moved from 1313 North Seventh Street, St. Louis, to 1516 North Seventeenth Street, increasing their floor space from 5000 to 10,000 sq. ft.

## Cincinnati

BIDS have been asked on general contract by Central Radial Drill Co., Sidney, Ohio, manufacturer of radial drills and other tools, for a one-story machine shop, 100 x 160 ft., to cost over \$70,000 with equipment. C. K. Saughard, Bellefontaine, Ohio, is architect.

Cincinnati Union Terminal Co., Temple Bar Building, Cincinnati, will issue bonds for \$12,000,000 and notes for \$15,000,000, proceeds to be used for new local terminal project, including cold storage facilities, conveying and other mechanical-handling equipment, etc. Engineering department, address noted, will be in charge.

Contracting Officer, Wright Field, Dayton, will receive bids until Sept. 23 for target and glider mount assemblies; until Sept. 22 for 5800 target assemblies and 220 cover assemblies, cable assemblies, electric heaters, plug assemblies, etc.; until Sept. 24 for aircraft hardware, and until Sept. 29 for springs, spool assemblies, clasps, gaskets, etc.

Emerald Coal Co., Rockport, Ky., plans rebuilding tippie and power plant recently destroyed by fire with loss more than \$150,000.

Tennessee Cereal Co., Nashville, Tenn., has asked bids on general contract for new one-story plant, to cost over \$65,000 with conveying and other equipment. Hart & Stone, Independent Life Building, are architects.

Kentucky Utilities Co., Louisville, has arranged for a bond issue of \$2,500,000, part of proceeds to be used for extensions and improvements in plants and system. Company is affiliated with Old Dominion Power Co., Louisville.

Standard Pattern Works, Inc., 1208 Queen City Avenue, Cincinnati, manufacturer of metal and wood patterns, has awarded contract to John Esterkamp, Eighth and Dalton Streets, for one-story addition, 50 x 100 ft., to cost about \$25,000 with equipment. Howard McClorey, Bank of Commerce Building, is architect.

Columbus Railway, Power & Light Co., 215 North Front Street, Columbus, Ohio, is arranging to rebuild part of car barn, with shop facilities, recently destroyed by fire, with loss of \$40,000

## Indiana

CONTRACT has been let by Tokiem Tank & Pump Works, 1602 Wabash Avenue, Fort Wayne, manufacturer of gasoline storage and pumping equipment, to Michael Kinder & Sons, 3714 South Hanna Street, for a one-story factory addition.

Bendix Aviation Co., South Bend, manufacturer of aircraft instruments and equipment, a subsidiary of Bendix Corporation, is considering one-story addition, to cost over \$100,000 including equipment.

City Council, Richmond, plans extensions and improvements in municipal electric light and power plant, with installation of a 15,000-kw. generator unit and auxiliary equipment, to cost \$1,000,000. A bond issue is being arranged. John Graham is chief engineer.

Chevrolet Motors, Inc., 410 West Tenth Street, Indianapolis, manufacturer of aircraft motors and parts, is planning increased production at local plant.

American Can Co., 230 Park Avenue, New York, has work under way on a three-story addition to plant at Terre Haute, 180 x 350 ft., with smaller units adjoining, to cost about \$1,000,000 with machinery. Engineering department of company is in charge.

Central Natural Gas Corp., Indianapolis, has been organized as a subsidiary of Central Public Service Corp., 105 West Adams Street, Chicago, to take over and operate pipe lines and other properties of parent company in Indiana and Kentucky, heretofore held by Public Service Engineering Corp. New organization plans expansion, including new wells in Kentucky gas fields, and construction of a pipe line to central Indiana, about 260 miles, to cost over \$1,500,000 with booster stations and operating facilities. Engineering department of parent organization is in charge.

Airport Division, Board of Works, Indianapolis, has work nearing completion on a new combination hangar and administration building, with repair facilities, etc., at municipal airport at Ben Davis, near city, to cost about \$125,000 with equipment. Paul H. Moore is superintendent at airport.

## Pacific Coast

PLANS are under way by General Petroleum Corp. of California, Inc., 310 Sansome Street, San Francisco, for new oil storage and distributing plant, to cost over \$750,000 with equipment. Engineering department of company is in charge.

Municipal Light Department, Pasadena, Cal., will soon take bids for an addition to electric light and power plant, 100 x 150 ft., to cost about \$150,000. Bennett & Haskett, First Trust Building, are architects.

Edison Electric Appliance Co., Ontario, Cal., manufacturer of domestic electrical appliances and equipment, has awarded general contract to Campbell Construction Co., 223 East Transit Street, for one-story addition, 150 x 180 ft., to cost over \$200,000 with equipment. Other units will be erected later. Company is affiliated with General Electric Co., Schenectady; headquarters are at Chicago.

Sierra Pacific Power Co., Reno, Nev., has arranged for a bond issue of \$1,400,000, part of fund to be used for exten-

sions and improvements. Company has recently acquired Nevada Valleys Power Co., operating at Churchill, Pershing and other counties, and will carry out development in that territory, including power lines.

R. E. Tourneau Mfg. Co., 122 Moss Avenue, Stockton, Cal., manufacturer of road-building machinery, earth-moving equipment, etc., is contemplating one-story addition, to cost about \$45,000 with equipment.

B. T. McBain and A. B. Galloway, Portland, are considering site at Hoquiam, Wash., for a new pulp and paper mill, with machine shop, power house and other structures, to cost close to \$2,000,000 with equipment. Work is scheduled to begin in fall. Company will be organized.

Board of Directors, United Airport, Burbank, Cal., has plans for new steel hangar, 240 x 300 ft., with repair department and other facilities, to cost over \$150,000. Austin Co. of California, Los Angeles, is engineer.

Pacific Gas & Electric Co., 245 Market Street, San Francisco, has plans for a one-story equipment storage and distributing plant at Auburn, Cal., to cost about \$45,000. In connection with expansion program authorized early in year, to cost \$35,000,000 for new power plants, transmission and distributing lines, company has fund of about \$12,000,000 to be expended during fall and winter.

Sunset School District, Carmel, Cal., has plans for extensions in vocational training shop at local high school. Swartz & Ryland, Spazier Building, Monterey, Cal., are architects.

## Foreign

PLANS are under way by Standard Oil Co. of New Jersey, 26 Broadway, New York, for new oil refinery, storage and distributing plant, with shipping docks, etc., for direct unloading of tank steamers at Port Jerome, near Rouen, France, where about 450 acres has been secured. Initial project will cost over \$8,000,000 with equipment. It is understood that work will be carried out in name of Franco-American Refining Co., in which Standard company holds a controlling interest. Similar plant is under consideration by company on Tancarville Canal, France, which follows course of Seine River.

Champion Spark Plug Co., Upton Street, Toledo, Ohio, is planning construction of new plant at Sydney, Australia, to cost over \$100,000 with equipment.

Bids will be received until Nov. 5 by Bureau of Yards and Docks, Navy Department, Washington, for a refrigerating plant for naval operating bases at Pearl Harbor, T. H.

Harbor Board, Wellington, New Zealand, has awarded a contract to Swan, Hunter & Wigham Richardson, Wallsend, England, for construction of floating dock for Wellington harbor, 540 ft. long, 117 ft. wide, to cost over \$5,000,000.

Kreuger & Toll Co., Stockholm, Sweden, operating Swedish Match Co., paper and pulp properties, and other industries, has acquired a controlling interest in L. M. Ericsson Telephone Co., Stockholm, manufacturer of telephone instruments and equipment, and operator of telephone concessions in Europe and South America. Ivar Kreuger, president of purchasing company, will be active in

management of Ericsson company, which will carry out development and expansion program.

Ford Motor Co., Dearborn, Mich., operating Stout Metal Airplane Co., same address, is considering new aircraft plant near Copenhagen, Denmark, including parts and assembling departments. Company has made offer to Danish Post and Telegraph Services of Government to establish regular air route between Copenhagen and points in Jutland.

## Canada

**P**URCHASE of property adjoining its plant at Point St. Charles, Que., is contemplated by Dominion Glass Co. for erection of an addition.

City Council, Edmonton, Alta., has authorized plans for power house addition to cost \$150,000. Bids for construction and equipment will be called early in 1931.

Cranbrook Foundry & Machine Shops, Ltd., Cranbrook, B. C., has plans for a two-story foundry and machine shop, 40 x 60 ft., to cost \$12,000.

E. Leonard & Sons, Ltd., York Street, London, Ont., has awarded contract to Hyatt Brothers, 290 Egerton Street, to rebuild plant recently damaged by fire.

Construction work is proceeding on new power plant at Lethbridge, Alta., for which equipment to cost \$200,000 will be purchased. Bids will be received until Sept. 23 for turbo generator. F. Steedman, City Hall, is clerk.

Landis Machine Co. of Canada, Ltd., Welland, Ont., has changed its name to Canadian Landis Machine Co., Ltd. Company makes Landis chasers, also a complete line of Landis threading die heads for threading machines, turret lathes and automatic screw machines. J. N. Stickell is superintendent and C. H. Gilland sales representative. Landis threading equipment is sold in Dominion by Canadian Fairbanks Morse Co.

## Metal-Clad Building for Chicago World's Fair

Twenty-five hundred tons of steel and 90,000 ft. of steel cable are to be used in the Travel and Transportation Building of the Century of Progress Building for Chicago World's Fair. The first steel column was set this week. This will be a windowless metal building and, by the use of the suspension bridge principle for the dome, will provide a great floor area free from columns and other obstructions. The exterior of the structure will be covered with metal. The main portion of the building will be 145 ft. wide by 1000 ft. long.

A memorial monument to George Westinghouse, inventor and founder of the industries which bear his name, will be dedicated in Schenley Park, Pittsburgh, on Oct. 6. Following the dedication and unveiling of a bronze group, created by Daniel Chester French, a banquet will be tendered to leaders of industry, science and art who will attend the ceremony. Erection of the memorial was made possible by subscriptions from 60,000 employees of Westinghouse industries in the United States and other countries.

# To Discuss Steel Making

## Slags and Impurities and Their Effects on Quality of Steel

**N**EW methods of refining steel, new conceptions of the function of slags in steel making, and new methods of determining harmful impurities in steel will be topics at the fourth annual meeting, on Oct. 17, of the Metallurgical Advisory Board to the United States Bureau of Mines and the Carnegie Institute of Technology. A report on the study of iron-manganese-carbon alloys will be given.

Methods of deoxidizing open-hearth steel, whereby much cleaner steel is obtained than that now produced, will be described in detail. The experiments cover small melts made in high-frequency induction furnaces, melts made in 300-lb. electric furnaces, and a series of heats made in large open-hearth furnaces. The story of this work is an excellent illustration of the working out of a problem in the laboratory, with its ultimate transfer to practical operation in steel plants.

Slags, which always have been, and probably always will be, one of the controlling factors in the production of good steel, have been a subject of special scrutiny by the research engineers. Experiments in laboratory and in plants indicate that certain properties of slag which have been little studied have a decided effect upon the speed of working of the furnace, and the ultimate reliability of the product.

### Quick Measure of Impurities

Among the new ways of determining injurious impurities in steel are the electrolytic method for determining non-metallic inclusions, the aluminum method for determining iron oxide in liquid steel, and the inclusion count method for determining metallographically the amount of silicates present in a given sample of steel. All three of these methods are so much faster and more accurate than older methods that experimental work has been speeded up tremendously. The correct answer to a number of operating problems is now readily obtainable, whereas, in the past, methods of determining these impurities have at best been an approximation.

To illustrate the speed of these processes, iron oxide may be determined in liquid steel with excellent accuracy in approximately 3 hr. By older methods this determination required from one to two days. Non-metallic inclusions in steel may be determined by the inclusion count in about 30 min. from the time a sample is received, and a quantitative count of the oxides in steel may be made in from 24 to 36 hr. by the electrolytic method. This, contrasted with the weeks required by older methods, is

one of the foremost steps in iron and steel technology.

Fundamental data regarding solubilities and equilibria between the various constituents which make up the raw materials and slags and metals in our present-day steel-making practice will be presented.

### Those Who Will Present Papers

The meeting will open at the Bureau of Mines with an address by Dr. F. N. Speller, chairman of the advisory board and director, department of metallurgy and research, National Tube Co. Following this, metallurgists of the Bureau of Metallurgical Research, Carnegie Institute of Technology, will give a progress report on iron-manganese-carbon alloys, a study which has been conducted by them for several years.

Dr. F. M. Walters, Jr., director of the bureau; Dr. V. N. Krivobok, Dr. J. B. Friauf, Cyril Wells and Maxwell Gensamer, associates, will present papers on different phases of this study. Dr. Krivobok will report also on his studies on the stainless iron alloy which contains 18 per cent chromium and 8 per cent nickel.

During the afternoon session Dr. C. H. Herty, Jr., physical chemist of the United States Bureau of Mines, and Dr. G. R. Fitterer, associate metallurgist, will present an illustrated report on slag viscosity and deoxidation with aluminum-silicon alloys, and a progress report on fundamental studies in the laboratory. Dr. Herty will also deliver a report on plant research in open-hearth steel.

## Republic's Electric Welding Pipe Mill Completed

Equipment for the third unit of the electric welding pipe mill of the Republic Steel Corporation at Youngstown has been installed and will be placed in operation early this week, according to company officials. The latest unit rounds out the \$10,000,000 development begun last year. The electric welding mill is booked with tonnages sufficient to provide capacity operations through the late fall.

Completion of the plant gives Republic an annual capacity in electric welded pipe from 2 to 16 in. in diameter of 420,000 tons annually.

The electric foundry of the Otis Steel Co., Cleveland, had the largest month's shipments in its history in August. The foundry produces small alloy castings and the recent volume has resulted from large orders for castings used in the construction of electric welding pipe mills.



# Continental Steel Cartel Is Extended with Reduction in Production Quota

(By Cable)

LONDON, ENGLAND, Sept. 15.

THE Continental Steel Cartel has been prolonged until the end of the year with fourth quarter output reduced by a further 15 per cent. German delegates at the recent meeting declared that the sales offices for semi-finished material and beams may be considered dissolved. Meanwhile low prices continue and British users of semi-finished have bought substantially at the new level. Mills, however, are still insufficiently booked with tonnage.

The International Rail Makers Association prices are unchanged. The Continental Wire Rod Cartel has reduced prices to the United Kingdom by 12s. 6d. (\$3.04) per ton to £5 2s. 6d. (\$24.90) per ton, f.o.b. The cartel has also reduced its quarterly output by 65,000 tons to 360,000 tons.

Swan, Hunter & Wigham Richardson, Ltd., has secured a French contract for a 3500-ton cargo vessel. The Rushton Tractor Co. of Walthamstow, London, has been awarded a large contract for tractors in Algeria. The National Shipbuilders' Security Co. has purchased Beardmore's Dalmuir shipyard, which will be closed permanently on completion of present contracts. Negotiations are proceeding for the purchase and closing of two other yards.

United Kingdom exports of pig iron in August totaled 19,000 tons, of which the United States received 15 tons. Total exports of iron and steel were 219,000 tons.

**Continental Steel Cartel Reduces Total Output Quota 15 Per Cent More for Last Quarter.**

\* \* \*

**British Semi-Finished Consumers Buy Heavily of Continental Steel at Present Low Prices**

\* \* \*

**Germany Cultivating Tin Plate Business With Far East.**

\* \* \*

**Plate Mills in Germany Drastically Reduce Prices to Stimulate Export.**

Tin plate mills not members of the conference have sold at 17s. 9d. (\$4.13) per base box, f.o.b. works port, and it is reported that certain conference mills have broken the minimum price. A makers' meeting will be held Sept. 23, at which prices may be reduced based on lower cost foreign steel. The tin plate market is moderately active and export users are showing increased interest.

Galvanized sheets are inactive and mills are seriously in need of orders. Sheet makers meet this week, when it is anticipated that prices will be reduced on the basis of lower costs. August exports of sheets at 28,000 tons were the lowest in many years.

The general domestic situation is

unchanged and the winter outlook is gloomy. Indications are that Cleveland pig iron consumers are more inclined to replenish their stocks, but buying is still insufficient to materially improve furnace operations.

Continental and Indian pig iron are still coming in, but British makers are maintaining prices.

Finished steel is very quiet, with consumers' confidence badly shaken by the fresh collapse of Continental steel prices, so that mills are unable to secure adequate specifications.

Contrary to expectations, Guest, Keen, Baldwins, Ltd., have issued a 28-day notice to employees of the Dowlais works, after which these workers will be employed on daily contracts.

## British Iron and Steel Output Fell in August

LONDON, ENGLAND, Sept. 12 (By Cable).—There was a sharp falling off in both the pig iron and steel output of Great Britain in August. Pig iron production was 416,700 gross tons and that of steel ingots and castings was 451,300 tons. The monthly output in gross tons this year, with comparisons, is shown below:

	Pig Iron	Steel
August, 1930.....	416,700	451,300
July, 1930.....	486,100	621,400
June, 1930.....	563,200	600,100
May, 1930.....	614,500	692,800
April, 1930.....	619,600	696,100
March, 1930.....	665,800	826,100
February, 1930.....	597,000	776,400
January, 1930.....	650,000	771,100
Monthly average, 1929.....	631,600	800,600

## British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at \$4.8665 (par)

### British Prices f.o.b. United Kingdom Ports

Ferromanganese, export.....	£11 10s.	\$55.95
Billets, open-hearth.....	5 15 to £6 5s.	27.98 to \$30.41
Black sheets, Japanese specifications.....	12 5	59.61
Tin plate, per base box.....	0 17½ to 0 18	4.32 to 4.38
Steel bars, open-hearth.....	7 15 to 8 5	1.69 to 1.79
Beams, open-hearth.....	7 7½ to 7 17½	1.60 to 1.71
Channels, open-hearth.....	7 12½ to 8 12½	1.66 to 1.87
Angles, open-hearth.....	7 7½ to 7 17½	1.60 to 1.71
Black sheets, No. 24 gage.....	9 10 to 9 15	2.06 to 2.12
Galvanized sheets, No. 24 gage.....	11 17½	2.57

### Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.....	£2 12½s. to £2 13s.	\$12.66 to \$12.90
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Billets, Thomas (nominal) 3 13 to 3 14	17.76 to 18.00
Wire rods, low C., No. 5 B.W.G. 5 2½ to 5 7½	24.94 to 26.15
Rails, light 6 0	29.20
Black sheets, No. 31 gage, Japanese 11 5 to 12 12	54.68 to 58.32
Steel bars, merchant 4 6	0.95
Steel bars, deformed 4 10 to 4 11	0.99 to 1.00
Beams, Thomas, British standard (nominal) 4 7 to 4 8	0.96 to 0.97
Channels, Thomas, American sections 5 12 to 5 14	1.24 to 1.26
Angles, Thomas, 4-in. and larger, over ¾-in. thick 4 8½ to 4 9½	0.97 to 0.98
Angles, Thomas, 3-in. 4 5 to 4 6	0.94 to 0.95
Hoop and strip steel over 6-in. base 4 1 to 4 2	0.92 to 0.93
Wire plain, No. 8 gage 5 17½	1.29
Wire, barbed, 4-pt. No. 12 B.W.G. 9 15	2.11
Wire nails, base 5 17½	\$1.29 a keg

## Rustless Steel Company Formed in England

LONDON, ENGLAND, Sept. 6.—Despite the general depression of business, a new steel company has been organized by P. R. Kuenrich, a director of Darwins, Ltd., manufacturer of safety razor blades. The new corporation known as the Universal Rustless Steel Corporation, has capital stock of £160,000 (\$778,560) and will manufacture small rustless steel products from steel furnished by associated companies in Sheffield.

## Plates Reduced in Germany To Stimulate Export

HAMBURG, GERMANY, Sept. 3.—Scarcity of orders for plates from shipyards has necessitated vigorous efforts to increase export trade by the steel mills. The price range of £7 5s. to £7 7s. 6d. a ton (1.60c. to 1.63c. a lb.), which was unaltered for some months, has been reduced and mills are in some cases quoting £6 5s. a ton (1.38c. a lb.) and accepting 2s. to 3s. a ton lower price for sizable tonnages. These prices have served to stimulate some foreign buying, and recent orders have been from Japan, South America, Turkey, Italy, Sweden and Ireland, with some small lots from the United States.

## No Embargo on Russian Manganese Ore Expected

WASHINGTON, Sept. 16.—The prevailing unbiased view here is that the Treasury Department will not impose an anti-dumping duty on manganese ore imported from Russia. Necessarily, the accuracy of this belief can be determined only by the Bureau of Customs after it has completed its investigation of the charge of the American Manganese Producers' Association that the Russian ore is being sold into the United States at less than the cost of production.

The bureau has not indicated how long it will require to bring its inquiry to an end. In addition to hearing from domestic producers and a representative of the American Federation of Labor in support of and from the American Iron and Steel Institute in opposition to the charge, the bureau has its agents at work gathering what facts are ascertainable. Such material as can be obtained through consuls and other Government representatives abroad will be gathered. Since the United States has no diplomatic relations with the Soviet Government, apparently no investigation can be made in Russia. This complicates the task.

Deputy Commissioner J. D. Nevius of the bureau at the hearing here on Tuesday of last week conceded that the difficulty lies in getting facts which would justify imposition of an anti-dumping duty. This is recog-

nized by all interested parties, and, while a great deal of material has been submitted by domestic manganese producers evidently it is felt that it is insufficiently specific and is inconclusive. Mr. Nevius added that, if there is reason to suspect dumping, it would be the duty of the bureau to delay appraisement of imports of manganese ore from Russia until the case had been concluded and final action taken.

Previously, Assistant Secretary of the Treasury Seymour Lowman said that the evidence must be conclusive before an anti-dumping duty would be imposed. This was taken to indicate the improbability of such action by the Treasury. Back of this also lies the experience of Mr. Lowman after he had issued an order embargoing imports of pulpwood from Russia. The life of this embargo was 36 hr. Mr. Lowman lifted the embargo after that short period, an about-face not common to the Treasury Department. It is reported that this sudden turn was forced upon orders from a higher source. The lifting of the pulpwood embargo recalled a statement by President Hoover that the United States does not intend to let its trade relations with Russia be affected because of the latter's political system.

It is realized that issues involved in the pulpwood and manganese cases are not analogous. But it is contended that of the two the pulpwood case was supported with much more specific evidence in support of the charge that it was produced by convict labor than that provided to support the claim that manganese ore is being dumped into the United States.

The position of the steel industry, as represented by Thomas J. Doherty, tariff counsel, American Iron and Steel Institute, is that actually Russian ore is being sold in the United States at higher prices than it is being sold for in other countries. Moreover it is maintained that there is no commercial manganese industry to destroy. These contentions, of course, have been strongly assailed by President J. Carson Adkerson of the American Manganese Producers' Association and by domestic producers.

McClintic-Marshall Co., Pittsburgh, has published an illustrated booklet depicting the progress of the construction of the Ambassador bridge, spanning the Detroit River between Detroit and Windsor, Ont., which was open to vehicular traffic Nov. 15, 1929. The entire project was designed and constructed by the McClintic-Marshall Co.

American Manganese Bronze Co., Holmesburg, Philadelphia, has taken an order for more than 1,000,000 lb. of special manganese bronze castings, varying from 4000 to 28,000 lb. each, for a new water supply system for New York. This order is said to be largest contract placed for bronze castings since the war.

## German Scrap Dealers Seek Larger Exports

HAMBURG, GERMANY, Sept. 3.—An abundance of steel scrap supplies has led dealers to seek freer granting of export licenses as a means of strengthening the market. The steel industry, however, is vigorously opposing any change in the regulations governing exportation of scrap, pointing out that by the Treaty of Versailles Germany lost about 75 per cent of its former iron ore resources and must depend largely upon low-priced scrap to offset iron ore costs higher than in other Continental countries. Meanwhile, at the recent low prices for steel scrap, collection of material lagged. Now the market is showing slightly increased strength, with heavy melting steel quoted at 41 to 43 m. (\$9.75 to \$10.25) a ton, delivered.

## German Steel Plant Sold for Scrap

HAMBURG, GERMANY, Sept. 3.—The entire plant and equipment of the Eisenwerk Gaggenau, A. G., a producer of alloy steels and small hardware products, was recently sold at auction. The company had been unable to pay dividends for some time and the general depression in business resulted in complete failure. Although the plant and equipment had an estimated value of 2,500,000 m. (\$595,000) it went for about its value as scrap 200,000 m. (\$47,600).

## Japan to Buy Plant for Ferromanganese

BERLIN, GERMANY, Sept. 1.—An inquiry is being quoted on in Germany for equipment to produce 15,000 to 20,000 tons of ferromanganese annually at the Yawata plant of the Government Steel Works in Japan. German engineering companies are also quoting on a large plant to be erected near Natal in South Africa.

## Far East Is Buying German Tin Plate

HAMBURG, GERMANY, Sept. 3.—Lacking tin plate business from the usual European sources, the German industry is seeking to develop trade with the Far East. In the past, Germany has shipped no tin plate to Far Eastern consumers, but recently some small orders have been booked and further increases are expected.

During the first six months of this year \$56,974 was paid to employees of the General Electric Co. for suggestions of plans to improve their jobs. Altogether, 17,474 suggestions were made and 5616 were adopted, compared with 13,200 suggestions offered in the first six months of 1929 and an adoption of 3953, for which \$49,586 was paid to employees.

## New High-Strength Light Alloy Sheet

A NEW high-strength light alloy sheet has recently been offered to the trade by Aluminum Co. of America. This material is, strictly speaking, not a new alloy but rather a new temper of 17S, a duralumin type alloy. After heat treating and aging, the sheet is given a small, carefully controlled reduction in thickness by cold rolling. The small amount of strain hardening of the heat-treated sheet increases the yield point by about 40 per cent, with a loss of only about 30 per cent in the elongation. The tensile strength is increased by about 5 per cent. The resulting sheet, while not quite so ductile as 17ST sheet, is still capable of considerable forming; the radius of bends must be somewhat greater, in general about one thickness of the sheet greater than is required for 17ST.

This material was developed for the Goodyear Zeppelin Corporation to be used in the construction of the rigid dirigible airship for the United States Navy. The company is expanding its rolling capacity and is now prepared to supply this type of sheet to the general trade. This is not the first time that a strain-hardened, heat-treated sheet has been manufactured for sale, but it is the first time that there has been available in this country a heat-

treated, light alloy sheet having the combination of higher yield point and comparatively high elongation.

The following table shows a comparison of the tensile properties of 17ST or ordinary heat-treated duralumin with the new product which is known as 17SRT:

*Mechanical Properties of Aluminum Sheets*

	17ST		17SRT	
	Mini- mum	Average	Mini- mum	Average
Tensile strength, lb. per sq. in.	55,000	59,000	58,000	63,000
Yield point, lb. per sq. in.	30,000	36,000	42,000	47,000
Elongation, per cent in 2 in.	15 to 18	17 to 21	10 to 12	12 to 14

The amount of rolling is controlled to produce the required increase in the yield point and at the same time retain the elongation which is necessary to permit a reasonable amount of forming to be done on the sheets. Each sheet is gaged before and after rolling; as it is found not possible to merely roll to nominal gage for heat treatment and finished size.

This new type of sheet is not available in quite the range of sizes and gages that are possible in 17ST. New equipment is being installed which will permit increasing the size limits which are now commercial.

## Aging Due to Nitrogen in Steel

THE theory is advanced by Werner Köster in *Stahl und Eisen* for May 8, that aging phenomena, such as magnetic aging and mechanical aging, are the result of the separation from solid solution at low temperatures of the nitrogen dissolved during manufacture of the steel.

This theory was investigated by observing the magnetic and physical properties of several acid and basic open-hearth steels which were aged for varying lengths of time at temperatures from 65 to 110 deg. C. The separation of nitrogen as iron nitride was observed microscopically by means of Fry's etching reagent.

It was found that the increase of coercive force and specific resistance of different steels, similarly treated, was proportional to the amount of nitrogen present. It is stated that the accuracy was so great that a determination of these properties might be used as an analytical method for nitrogen, with a precision of 0.001 per cent.

The separation of 0.01 per cent nitrogen is accompanied by the following changes:

Specific resistance .....—0.0013 ohms per mm. cube.  
Coercive force .....+3.2 gauss.  
Tensile strength .....—3,200 lb. per sq. in.  
Solubility in acids .....+20 per cent.

The solubility of nitrogen is given as 0.001 per cent at room temperatures, 0.005 per cent at 200 deg., 0.01 per cent at 300 deg. and 0.02 per cent at 400 deg. C. The difference in nitrogen content is suggested as a reason for the variance in physical properties between open-hearth and Bessemer steel.

It was also shown experimentally that precipitation of nitrogen is accelerated by cold working and

gives rise to the characteristic strain figures when treated with Fry's reagent.

Certain steels show greater or less tendency to aging, depending on their method of manufacture and their composition. Thus Bessemer and electric steels age more than open-hearth products. Steels containing silicon or aluminum tend to age markedly, whereas acid open-hearth and special basic products such as Izett steel, do not age at all.

## Institute Statistical Report for 1929

American Iron and Steel Institute has issued its annual statistical report for last year in a volume of 119 pages, in the familiar light blue cover. It follows the line of the enlarged report of last year, giving a considerable amount of foreign data, in addition to the great mass of information regarding the operations of iron and steel works in the United States.

Among items noted—the number of completed blast furnaces in the United States at the end of the year was given as 316, of which eight are charcoal. This represents a drop of 150 furnaces, or almost one-third, from the figure of 1912. The decline in the last five years has been 109 units and every year since 1917 has shown a decrease. Annual capacity is given as 50,921,450 gross tons.

Similarly, for steel ingots and castings, the annual capacity in 422 plants is stated as 65,165,541 gross tons. Relating production of the record year 1929 to capacity at the end of that year, it appears that blast furnace capacity was engaged to the extent of 84 per cent, as an average for the year, whereas steel-making capacity was engaged at 87 per cent.



## **Workers and "Talent" Share in Profits**

*(Concluded from page 763)*

earned, an additional dividend up to \$1 per share to stockholders with a gross allotment to talent equal to total of first increment for stockholders; if earned, an additional dividend up to \$1 more per share to stockholders with a second gross allotment to talent equal to total of second increment for stockholders and an initial gross allotment to employees of one half of second increment for stockholders; if earned, any surplus above 5 per cent to stockholders with the afore-said increments to talent and to employees is divided two-ninths to stockholders, four-ninths to talent and three-ninths to employees."

This distribution is not so favorable to talent as compared with labor as it might appear, because the market shop wages doubled as a result of the war and have never receded, while the executive men enjoyed no such salary advance. It was deemed safer for the stockholders to pay the executives well if the company did well, but to have no high salaries fixed by contract and thus guaranteed by the stockholders.

While this formula seems to work pretty well with us just now, it is always subject to change and would necessarily be different for different enterprises according as they depended for success on the courage of their capitalists, or the skill of their workmen, or on the perseverance and resourcefulness or inventiveness of their directors.

The essential principle, however, is based on the equity and social advantage of paying a fair price for labor and talent, as explained in the first part of this article and as expanded somewhat in a little pamphlet we published entitled "Industrial Unrest." We believe this principle to be sounder economically, and hence better for all concerned, than either Marxian socialism or trades unionism, and we realize that this is rather a gigantic claim to make.

## **Spring Wire Specially Heat Treated**

*(Concluded from page 766)*

duces scale. This, as well as any decarbonized surface, must be removed before any wire drawing or cold rolling is done. The conventional way of cleaning is to pickle the loose coils in dilute sulphuric or hydrochloric acid, wash them thoroughly and bake and then dip in lime-water.

It appears that when acid corrodes steel, the metal absorbs some of the atomic hydrogen set free in the chemical reaction. This occluded hydrogen has a pronounced embrittling effect and is removed by the careful baking above mentioned. The hydrogen "evaporates" the more rapidly at a high temperature. Pickled steel which has not been baked is said to be "acid brittle."

There is well-founded suspicion that even a thorough baking will not entirely cure the defect. Some of the obscure failures encountered in spring manufacture, or in storage or use, have been ascribed to a trace of hydrogen remaining in the steel. There is so much to support this view, that the Wallace Barnes

Co. has installed in its cold-rolling mills at Forestville, Conn., a sand-blasting device for cleaning the strip mechanically. Thus the high-carbon steels, which are especially susceptible to hydrogen embrittlement, will never be immersed in acid.

The above facts also explain why quenched and tempered springs cannot be rust-proofed by galvanizing or by any metal-coating process which requires preliminary cleaning in acid. Various degrees of rust protection may be given to springs by slushing oil, lacquer or baked enamel. For most severe conditions corrosion-resistant alloys would be used, like bronze or stainless steel.

## **Galvanizing Furnaces**

*(Concluded from page 771)*

Monthly tonnage, up to 800 tons.

It so happens that the methods employed are adapted to the use of either gas fuel or oil fuel, and can be employed to advantage with electric heat.

During the four years of continuous service, this galvanizing kettle has not been repaired, never having developed a leak at any point. So far as known it is still in good condition, despite the fact that, so far as known, it holds the record for maximum production per hour, per day, and for its operating hours during the whole period.

Likewise, the furnace has never been subject to a major repair in all the four-year period.

Operating cost, in cubic feet of gas fuel per ton of product, is said to be a minimum for a kettle of this size and for work of the character done. The accumulation of dross in per cent, based on spelter charged, is likewise a minimum, based on size of kettle, product and other parallel conditions.

Exact facts concerning these features we are not at liberty to publish. But the Witt Cornice Co. may furnish data direct, in answer to inquiries.

The merit of this result does not rest with the burner equipment. Two different burner outfits have been used in the period since this installation was made four years ago. The Anthony two-pipe burner system was used first. In the last few months, dating from about last January, the Surface Combustion Co. low-pressure type, single-pipe method has been used, with what is known as "Stictite" burner heads.

## **Unit Heaters**

*(Concluded from page 774)*

the greatest possible amount of exposure to cold winds.

For this particular service, one of the most successful methods has been to suspend the unit heaters between each locomotive pit and the next, and to provide adjustable outlets so that the hot air discharge can be directed down into the pits whenever desired. When a locomotive is brought in from the road with its running gear incrustated with ice and snow, the hot blast from the heater can be directed to the most effective spot, which is soon cleared so that repairs can be taken care of at once.

Some engineers prefer the use of a small number

of units of large capacity, as this usually requires fewer fittings and shorter runs of pipe in making the installation. Others prefer a number of smaller units distributed to various locations throughout the building. In the matter of outlets, also, some engineers insist upon specially designed arrangements for directing the air flow. These are often necessary, of course, on account of some obstruction which must be avoided, but often they are more or less arbitrary.

A few engineers have been hard to convince that the warm air could be properly distributed to the places where it was needed without a system of conductor pipes. However, unless some of the heat must be distributed to another room through a wall or partition, the use of conductor pipes is entirely unnecessary.

In many installations the temperature within the room is automatically controlled by the use of thermostats. In most instances this is accomplished by having the thermostat operate the switch which controls the fan motor. When the temperature reaches the maximum for which the instrument is set, it will automatically open the switch and stop the motor. When the temperature drops to the low limit, the thermostat will again close the switch and start the motor. In this case, the steam valve remains open, but the air circulation is stopped, except for the slight flow which is induced by gravity.

In most drying installations, such as are mentioned in a later paragraph, the circulation of the air is highly important. In such installations it is the usual practice to allow the fan to run continuously, and to regulate the temperature by using a thermostatically operated valve upon the steam supply line. In many drying installations a close temperature control is not essential. In others, not only must the drying be accomplished in a specified time, but the temperature must not be allowed to reach a point which will injure the material being dried. Here an accurate temperature control is essential to the success of the installation.

#### Ventilation, Drying and Summer Cooling Served, Also

These units, while designed primarily for heating, also have other very useful applications. One of these is to supply fresh air at room temperature for ventilating purposes. This can be accomplished with any of the standard units by connecting suitable intake ducts, and installing controlling dampers. A specially designed unit for this service is shown in Fig. 7. This has a by-pass arrangement built into the heater, with a double set of dampers under thermostatic control, which automatically regulates the outlet temperature.

Many plants have process work which necessitates the drying of certain materials. By proper applications of these units so as to give the correct amount of air at the proper temperature, and by directing the air so that it will be evenly distributed, the drying time can be reduced manyfold.

Another use which is becoming more and more common is that of cooling during the hot summer months. By circulating a cooling medium through the coils these same units can be used for distributing cool air through the building when the natural temperature is too warm for comfort. While this has not

as yet had a very wide application, there is little doubt that future years will see this function of the unit heater of equal importance with that of heating during the cold season; for, after all, heating and cooling are both questions of human comfort.

### Cold Rolling

(Concluded from page 777)

source of fatigue cracks than are the notches and grooves left on the polished surface. That inclusions distinctly below the surface of the specimens became the nuclei of cracks in the specimens shown in Fig. 4 indicates that the cold-rolling operation protected the surface in a really effective manner.\*

In a bending-fatigue specimen, the stresses in any fiber are proportional to the distance from the center of the section (neutral axis). Therefore, the stresses at the region of the apparent nuclei for cracks located a distance of approximately 0.15 of the radius below the surface would have a value of about 85 per cent of the stresses at the surface, or in other words the stresses withstood at the surface are about 17 per cent higher than the stresses at the region of the inclusions where the cracks start. The increase, then, of the strength of the specimen due to the cold rolling may be estimated at 17 per cent.

\*Note by Prof. H. F. Moore: There is a striking resemblance between the fractures shown in Fig. 4 and "transverse fissure" fractures of railroad rails. Railroad rails in service are subjected to very pronounced cold-rolling action by car wheels, and possibly this action is not injurious but beneficial.

### Jointless Steel Rails Developed in Germany

A NEW invention by a German engineer, W. Abel, eliminates any actual gap between rail sections and substitutes for every rail joint a double series of alternating cuts fitting into one another like the teeth of two combs, without any break of the traveling surface of the wheels. If, for example, each such series comprises ten cuts, this allows the rail a play of ten times the thickness of each individual cut, enabling it to expand and contract accordion fashion.

Although the stress sustained in this connection is greatly relieved by the cuts, the high elastic tension, of course, calls for the use of high-grade material. This, however, need be chosen only for the portion comprising the cuts, which can be welded to the rail ends, this being, for example, the course to be adopted whenever the system is to be installed in existing railroad track. A fishplate and lateral guides should preferably be provided to protect the track against lateral deflection.

### Making Seamless Tubes

A comprehensive article on the manufacture of seamless tubes is found in a special issue of *Demag News*, published in connection with the World Power Conference in Berlin in June. Having 52 illustrations, both line cut and half-tone, the article took up all of the steps of the process of opening up the round billet in the crossed rolls, putting it through the Pilger kneading process and carrying it through

## Business as Others See It

Digest of Current Financial and  
Economic Opinion

**S**EASONAL recovery in business is seen by many observers to be getting under way. Buying in some lines is going on apace. Cases of laying in raw materials for a year or more ahead are reported, the belief being that the price bottom has been reached.

A gradual return of confidence is noted by *Commerce and Finance* as "noticeable in many directions." Lack of a continuation of the price decline is commented on by *Analyst*.

Though productive activity almost always starts upward ahead of a steady rise in prices, that journal thinks that "a rise in prices may conceivably appear on the records of business earlier in time than the statistical evidences of the business expansion which are in reality the cause of the advance in price level."

Another commentator finds all lines pointing toward firmer prices, steadier and even advanced production, and the prospect for noticeable improvement during the fourth quarter. That the end of July marked the low point is the belief of Cleveland Trust Co., which finds "processes of improvement demonstrably under way in recent weeks, and some of them more than merely seasonal."

*Business Week* finds evidence that "business recovery, beginning as usual with the basic industries and primary distribution, is proceeding normally in response to seasonal stimulus. . . . Business is beginning to feel better than it looks." That journal finds that manufacturers, wholesalers and retailers have carried hand-to-mouth buying so far that renewed public buying starts a scramble

for spot deliveries to fill depleted shelves.

High wages in certain protected callings and industries come in for further attack. *Financial Chronicle* asks: "What is it renders wages immune to the fall of prices, the slower momentum of business and low interest rates now prevailing? . . . May it not be that these high wages have forced men into unemployment by increasing the use of machinery?"

Building construction is a noteworthy example of high wage scales. Today there is no such shortage of buildings as existed in 1921, Harvard Economic Service points out. But, as obsolescence has been rapid in recent years, that organization expresses the belief that construction "will presently participate in a recovery of general business."

to a finish. Methods of reducing size, of drawing the tubes, and various other supplementary processes were described at the end of the article, which occupied 15 pages in all.

### Effect of Alloying Elements on Critical Points of Steels

**A**METHOD, much used in investigation of transformation points in steel and other metals, is that employing the Chevenard dilatometer principle. By means of it one may obtain an accurate record of the temperature at which sharp volume changes take place, as well as the effect of rate of heating or cooling on the location of the critical points.

To control the rate of heating at a definite value, Merz (*Stahl und Eisen*, Apr. 17) devised a motor-driven rheostat, which automatically increases the heating current. With this arrangement the apparatus may be safely left in operation over night.

He studied the relative positions of the arrest points of certain iron alloys, both with and without the addition of carbon. In the case of nickel steels it was found that the carbon exerted a lowering effect on the critical points; this contradicts the evidence of thermal analysis.

Pure iron-chromium alloys were also studied by the dilatometric method, which showed that chromium up to 5 to 7 per cent, lowers the A<sub>1</sub> point. Addition of carbon also depresses the critical points, but with no readily apparent relation to the amount of carbon present. In chromium-nickel steels, the nickel lowers the arrest points, particularly in cooling, while chromium appears to tend slightly in the opposite direction.

The expansion curves for tungsten steels reveal the fact that both A<sub>1</sub> and A<sub>2</sub> are raised by the

presence of this element. Investigation of silicon steels (by the expansion method) is difficult since, on continued heating, there is a tendency to the formation of temper-carbon. In general, however, there is a lowering of the critical points, which becomes less pronounced as the carbon increases.

The manganese steels were particularly interesting. There is a slight drop in the critical points as the alloy content is raised; furthermore, the slightest variation in the rate of heating or cooling produces large disturbances in the position of the arrest points.

### Largest Blast Furnace in Great Britain

Description in a recent number of *Iron and Coal Trades Review* of blast furnace No. 4 of the British Iron & Steel Co., Ltd., includes the information that this is the largest such unit in the Kingdom. It has been responsible for the "record output of 4008 tons of iron in one week."

This furnace measures 87½ ft. high, with a bosh 20 ft. in diameter and 11 ft. high, a hearth of 16½ ft.; throat, 14½ ft.; and bell 10½ ft. in diameter. The bosh angle is 80 deg. 17 min. and the furnace volume is 18,470 cu. ft.

Considerable American equipment is used in connection with this furnace. The charging gear, though built in England, is of American standard design. The skips deliver into a revolving hopper of the McKee type. There is a "standard American iron dam and two runners" arranged to fill two 60-ton mixer-type ladles.

This brief reference to the furnace is made mainly because, though it is the largest British furnace, its weekly capacity is only about one-half that of the largest American furnace.



# THE IRON AGE

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## "A Hit! A Palpable Hit!"

REMEMBER that "Executive Round Table" fea-  
ture in our Sept. 4 issue? (Memory-jogger: Five  
real company presidents seated at an imaginary round  
table, telling how they are cutting operating expenses  
in keeping with reduced output.)

Well, that new feature has gone over with a loud  
and very distinct bang. Wherever we go people tell us  
how much they like it. They even go to the trouble to  
write about it. The one at the top of the heap happens  
to be from the Sundstrand Machine Tool Co.:

feel quite sure that the executives of our company can secure some  
valuable information from it.

Crompton & Knowles Loom Works writes:

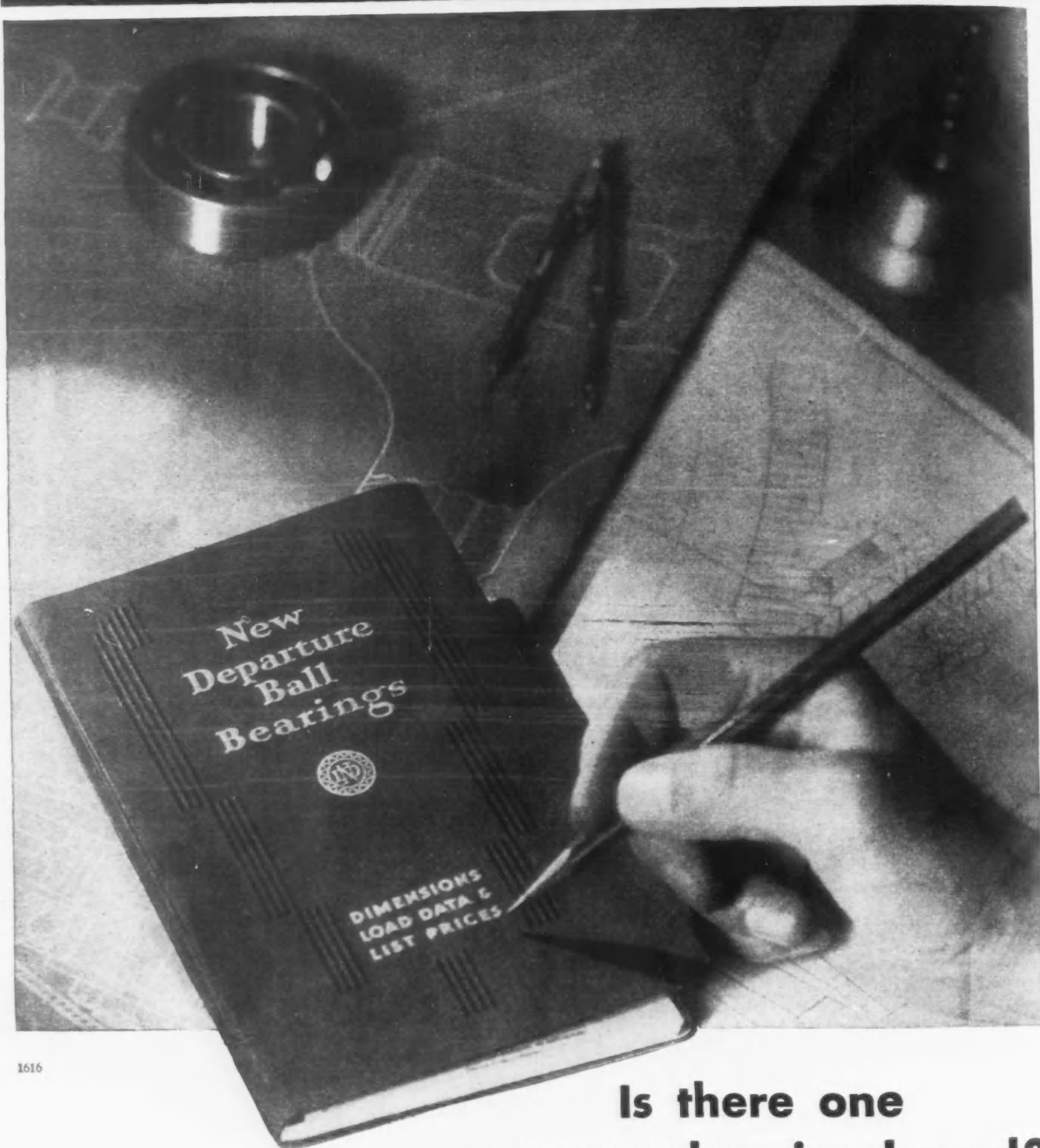
certainly can be applied to most any establishment where the  
question of cost reduction is an important item.

If you missed the first "meeting" of the Round Table,  
get out your Sept. 4 IRON AGE and turn to page 606.  
If you cannot find that issue, drop a line to our oblig-  
ing Reader Service Department (THE IRON AGE, 239  
W. 39th St., New York) and ask for a copy.

The second "meeting" of the Round Table will be  
held soon.



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